



(51) International Patent Classification:

G06Q 10/06 (2012.01) G06Q 50/12 (2012.01)

G06Q 30/06 (2012.01)

(21) International Application Number:

PCT/IB2022/051864

(22) International Filing Date:

03 March 2022 (03.03.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2021-048599 23 March 2021 (23.03.2021) JP

2022-026625 24 February 2022 (24.02.2022) JP

(71) Applicant (for all designated States except US): **RICOH COMPANY, LTD.** [JP/JP]; 3-6, Nakamagome, 1-Chome, Ohta-ku, Tokyo 1438555 (JP).

(72) Inventors; and

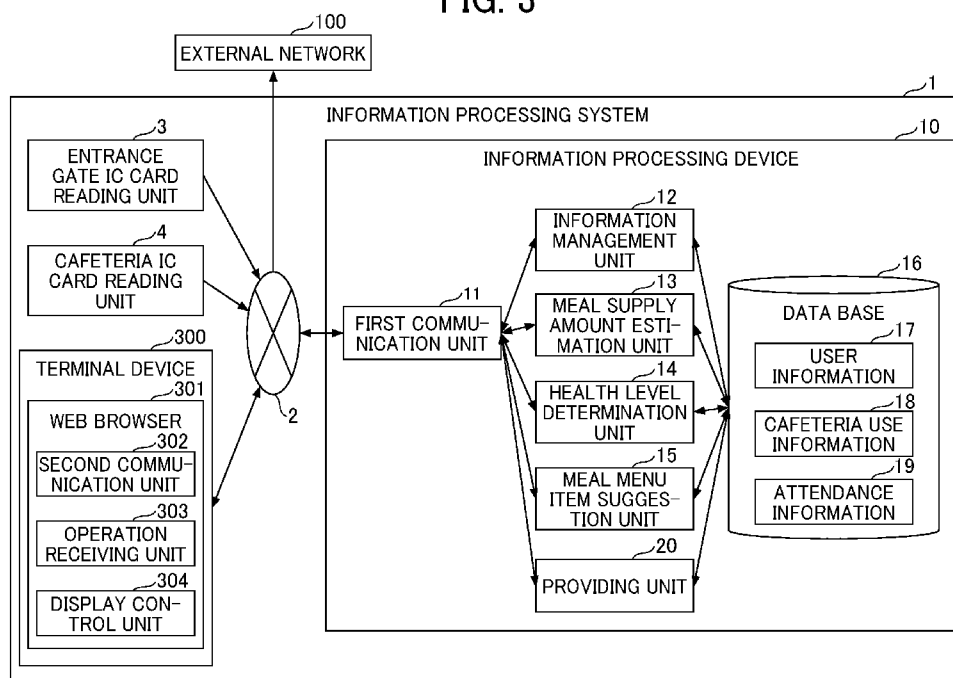
(71) Applicants (for US only): **KIMURA, Takayuki** [JP/JP]; C/O Ricoh Company, Ltd. 3-6, Nakamagome, 1-Chome, Ohta-ku, Tokyo 1438555 (JP). **SATO, Kodai** [JP/JP]; C/O Ricoh Company, Ltd. 3-6, Nakamagome, 1-Chome, Ohta-ku, Tokyo 1438555 (JP).

(74) Agent: **SUZUKI, Yasushi**; 2-7-1, Izumi, Ebina-shi, Kanagawa 2430460 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

(54) Title: INFORMATION PROCESSING DEVICE, INFORMATION PROCESSING METHOD, AND RECORDING MEDIUM

FIG. 3



(57) Abstract: An information processing device communicably connected to equipment of a facility including a cafeteria includes a meal supply amount estimation unit and a providing unit. The meal supply amount estimation unit estimates, based on information on attendance figures and information on a plurality of meal menu items served to a plurality of users in a past, a meal supply amount for each of the plurality of meal menu items, with respect to at least estimated attendance figures obtained based on the information on the attendance figures. The information on the attendance figures is obtained from the equipment, and the information on the plurality of meal menu items served to the plurality of users in the past is obtained from one or more pieces of the equipment in the cafeteria. The providing unit provides information on the meal supply amount estimated by the meal supply amount estimation unit.

HR, HU, ID, IL, IN, IR, IS, IT, JM, JO, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

[DESCRIPTION]

[Title of Invention]

INFORMATION PROCESSING DEVICE, INFORMATION PROCESSING METHOD,
AND RECORDING MEDIUM

[Technical Field]

[0001]

Embodiments of the present disclosure relate to an information processing device, an information processing method, and a recording medium.

[Background Art]

[0002]

By using integrated circuit (IC) cards such as employee identification information (ID) cards, using frequency of services or counting of presence or absence of employees may be performed, or a service may be proposed based on usage records. In an office such as a company, the number of users who use a cafeteria may be estimated based on entry records recorded by using an IC card. The related art estimates the number of meals to be supplied on a day based on records of attendance figures in the past for the purpose for estimating the number of meals to be supplied in a cafeteria.

[Citation List]

[Patent Literature]

[0003]

[PTL 1]

Japanese Unexamined Patent Application Publication No. 2018-205877

[Summary of Invention]

[Technical Problem]

[0004]

A conventional technique does not estimate the number of meals to be supplied for each menu item.

[Solution to Problem]

[0005]

In view of the above, an information processing device communicably connected to equipment of a facility including a cafeteria is provided. The information processing device includes a meal supply amount estimation unit and a providing unit. The meal supply amount estimation unit estimates, based on information on attendance figures and information on a plurality of meal menu items served to a plurality of users in a past, a meal supply amount for each of the plurality of meal menu items, with respect to at least estimated attendance figures obtained based on the information on the attendance figures. The information on the attendance figures is obtained from the equipment, and the information on the plurality of meal menu items served to the plurality of users in the past is obtained from one or more pieces of the equipment in the cafeteria. The providing unit provides information on the meal supply amount estimated by the meal supply amount estimation unit.

[Advantageous Effects of Invention]

[0006]

In view of the above, the present disclosure provides a technique to estimate the number of meals to be supplied for each menu item.

[Brief Description of Drawings]

[0007]

The accompanying drawings are intended to depict example embodiments of the present invention and should not be interpreted to limit the scope thereof. The accompanying drawings are not to be considered as drawn to scale unless explicitly noted. Also, identical or similar reference numerals designate identical or similar components throughout the several views.

[FIG. 1]

FIG. 1 is a diagram illustrating an overview of an information processing system according to a first embodiment of the disclosure.

[FIG. 2]

FIG. 2 is a diagram illustrating an example of a hardware configuration of each of an information processing device and a terminal device according to the first embodiment of the disclosure.

[FIG. 3]

FIG. 3 is a block diagram illustrating an example of the information processing system according to the first embodiment of the disclosure.

[FIG. 4]

FIG. 4A and FIG. 4B (FIG. 4) are diagrams each illustrating an example of a method for obtaining details of a meal according to the first embodiment of the disclosure.

[FIG. 5]

FIG. 5 is a diagram illustrating an example of a database related to user information according to the first embodiment of the disclosure.

[FIG. 6]

FIG. 6 is a diagram illustrating an example of a database related to cafeteria use information according to the first embodiment of the disclosure.

[FIG. 7]

FIG. 7 is a diagram illustrating an example of a database related to attendance figures indicating the number of users who enters from an entrance gate, according to the first embodiment of the disclosure.

[FIG. 8]

FIG. 8 is a flowchart illustrating a process performed by a meal supply amount estimation unit according to the first embodiment of the disclosure.

[FIG. 9]

FIG. 9 is a flowchart illustrating an example of a process performed by a health level determination unit according to the first embodiment of the disclosure.

[FIG. 10]

FIG. 10 is a flowchart illustrating an example of a process performed by a meal menu item suggestion unit according to the first embodiment of the disclosure.

[FIG. 11]

FIG. 11 is a diagram illustrating an example of a screen for transmitting a mail for suggesting a menu item to a user according to the first embodiment of the disclosure.

[FIG. 12]

FIG. 12 is a diagram illustrating an overview of an information processing system according to a second embodiment of the disclosure.

[FIG. 13]

FIG. 13 is a diagram illustrating an example of a functional configuration of the information processing system according to the second embodiment of the disclosure.

[FIG. 14]

FIG. 14A and FIG. 14B (FIG. 14) are a sequence diagram illustrating an example of a process according to the second embodiment of the disclosure.

[FIG. 15]

FIG. 15 is a diagram illustrating an example of entry/exit data according to the second embodiment of the disclosure.

[FIG. 16]

FIG. 16 is a diagram illustrating an example of cafeteria use data according to the second embodiment of the disclosure.

[FIG. 17]

FIG. 17 is a diagram illustrating an example of meal menu item data according to the second embodiment of the disclosure.

[FIG. 18]

FIG. 18 is a diagram illustrating an example of health checkup data according to the second embodiment of the disclosure.

[FIG. 19]

FIG. 19 is a diagram illustrating an example of biological data (1) according to the second embodiment of the disclosure.

[FIG. 20]

FIG. 20 is a diagram illustrating an overview of an information processing system according to a third embodiment of the disclosure.

[FIG. 21]

FIG. 21A and FIG. 21B (FIG. 21) are a sequence diagram illustrating an example of a process according to the third embodiment of the disclosure.

[FIG. 22]

FIG. 22 is a diagram illustrating an example of biological data (2) according to the third embodiment of the disclosure.

[FIG. 23]

FIG. 23 is a diagram illustrating an overview of an information processing system according to a fourth embodiment of the disclosure.

[FIG. 24]

FIG. 24A and FIG. 24B (FIG. 24) are a sequence diagram illustrating an example of a process according to the fourth embodiment of the disclosure.

[FIG. 25]

FIG. 25 is a diagram illustrating an example of entry record data according to the fourth embodiment of the disclosure.

[FIG. 26]

FIG. 26 is a diagram illustrating an example of operating day data according to the fourth embodiment of the disclosure.

[Description of Embodiments]

[0008]

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the present invention. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise.

In describing embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific element includes all technical equivalents that have a similar function, operate in a similar manner, and achieve a similar result.

A description is given below of an information processing device and an information processing method performed by the information processing device according to embodiments of the present disclosure, with reference to the drawings.

[0009]

First Embodiment:

System Configuration:

FIG. 1 is a diagram illustrating an overview of an information processing system 1 according to a first embodiment. A user has an integrated circuit (IC) card such as an employee identification (ID) card, and when entering a facility such as a building having plural business offices of a company, the user holds the IC card over an IC card reader 103 (an example of a piece of equipment) placed at an entrance gate to enter the facility. The entry of a user or the exit of a user is recorded in the database (entry and exit management, or access control, of the user is managed by the IC card carried by the user). The records can indicate attendance, or a presence, of the user at the facility. When the user has a meal in a cafeteria, the user uses the IC card to pay for the meal. At this time, the IC card reader 104 (an example of a piece of equipment) that is placed in the cafeteria obtains information on the user, and an IC tag reader 105 obtains details of the meal (details of the meal provided to the user). Each obtained information is recorded in the database.

[0010]

The information processing device 10 provides an estimated meal supply amount estimated by using the information recorded in the database to a meal supplier. In addition, the information processing device 10 uses the information stored in the database to provide information on nutrition intake of the user to an occupational health physician or to suggest a menu item to the user. The meal supplier supplies meals to the cafeteria based on the provided estimated meal supply amount.

[0011]

A system administrator or a system user operates the terminal device 300 to access the information processing device 10 to input conditions for processing of estimating a meal supply amount, to execute the processing, to obtain information, or to manage or maintain the device, for example.

[0012]

The information processing device 10 may be implemented by a single information processing device 10 or may be implemented by a plurality of information processing devices 10. For example, a single information processing device 10 may be prepared for each type of service, a single information processing device 10 may provide a plurality of services, or a plurality of information processing devices 10 may provide a single service.

[0013]

The information processing device 10 may support cloud computing. The cloud computing refers to a usage pattern in which resources on a network are used without being aware of specific hardware resources. The information processing device 10 that supports the cloud computing may be referred to as a cloud system. The information processing device 10 may be on the Internet or on-premises.

[0014]

In addition, the information processing device 10 creates screen information of a web page to be displayed on the terminal device 300 and transmits the screen information. The screen information is generated by Hyper Text Markup Language (HTML), Extended Markup Language (XML), Cascade Style Sheet (CSS), and JAVASCRIPT (registered trademark), for example. The web page may be provided by a web application. The web application refers to software or a mechanism that is executed on the web browser and operates by coordinating a program in a programming language (for example, JAVASCRIPT (registered trademark)) that operates on the web browser with a program on the web server. The web application can also dynamically change the web page.

[0015]

Hardware Configuration:

FIG. 2 is a diagram illustrating an example of a hardware configuration of each of the information processing device 10 and the terminal device 300. As illustrated in FIG. 2, each of the information processing device 10 and the terminal device 300 is implemented by a computer, and includes a central processing unit (CPU) 501, a read only memory (ROM) 502,

a random access memory (RAM) 503, a hard disk (HD) 504, a hard disk drive (HDD) controller 505, a display 506, an external device connection interface (I/F) 508, a network I/F 509, a bus line 510, a keyboard 511, a pointing device 512, a digital versatile disc rewritable (DVD-RW) drive 514, and a medium I/F 516.

[0016]

The CPU 501 controls entire operation of the information processing device 10 or the terminal device 300. The ROM 502 stores a program such as an Initial Program Loader (IPL) used for driving the CPU 501. The RAM 503 is used as a work area for the CPU 501. The HD 504 stores various data such as a program. The HDD controller 505 controls reading and writing of various data from and to the HD 504 under control of the CPU 501. The display 506 displays various information such as a cursor, a menu, a window, a character, or an image. The external device connection I/F 508 is an interface for connecting various external devices. The external device, for example, a universal serial bus (USB) memory or a printer. The network I/F 509 is an interface for performing data communication using a network 2. The bus line 510 is, for example, an address bus or a data bus, which electrically connects the components illustrated in FIG. 2, such as the CPU 501.

[0017]

The keyboard 511 is an example of an input device provided with a plurality of keys used to input characters, numerals, or various instructions. The pointing device 512 is an example of an input device that allows a user to select or execute various instructions, select an item for processing, or move a cursor being displayed. The DVD-RW drive 514 reads and writes various data from and to a DVD-RW 513, which is an example of a removable storage medium. The DVD-RW drive 514 is not limited to the DVD-RW and may be a digital versatile disc-recordable (DVD-R), for example. The medium I/F 516 controls reading and writing (storing) of data from and to a storage medium 515 such as a flash memory.

[0018]

Functions:

A description is given below of a functional configuration of the information processing system 1 according to the present embodiment with reference to FIG. 3. FIG. 3 is a block diagram illustrating an example of the information processing system 1 according to the present embodiment.

[0019]

The information processing system 1 includes an entrance gate IC card reading unit 3, a cafeteria IC card reading unit 4, an information processing device 10, and a terminal device 300, which are connected via the network 2.

[0020]

The entrance gate IC card reading unit 3 is a function implemented by the IC card reader 103 placed at the entrance gate. When a user enters a facility, the user holds his or her own IC card over the IC card reader 103, a record is added to an attendance information 19, which

indicates the number of users who pass through the entrance gate to enter the facility, in the database 16.

[0021]

The cafeteria IC card reading unit 4 is a function implemented by the IC card reader 104 placed in the cafeteria. A user holds his or her own IC card over the IC card reader 104 when paying for his or her meal. The cafeteria IC card reading unit 4 further communicates with an IC attached to a dish or a plate of the meal to acquire information on a menu item corresponding to the meal eaten by the user. As a result, the information on the menu item corresponding to the meal is recorded in user information 17 of the database 16. It is assumed that the menu items in a menu can be classified into some types, such as for example, meal type A: Western food, meal type B: Japanese food, and meal type C: Ramen.

[0022]

FIG. 4A and FIG. 4B are diagrams each illustrating an example of a method for obtaining details of a meal. An IC tag is attached to underside of a dish or plate on which the food of menu item presents. A menu item ID is assigned to each IC tag, and the menu item ID differs depending on a menu item. In other words, the IC tag stores a menu item ID. First, the IC tag reader 105 reads the IC tag at a time of processing the payment and gets information on the menu item indicating the meal provided to the user. In addition, using the IC card with which the user is identifiable for processing the payment allows the cafeteria IC card reading unit 4 to associate the user with the menu item information indicating the provided meal. Note that this method is an example, and any method may be used as long as information on the menu item indicating the meal ordered and ate by the user can be obtained by using anything with which the user is identifiable, such as an IC card. For example, face authentication may be used to identify the user, or a menu item indicating a meal eaten by the user may be identified by the user selecting the menu item with a button.

[0023]

Referring again to FIG. 3, the information processing device 10 includes a first communication unit 11, an information management unit 12, a meal supply amount estimation unit 13, a health level determination unit 14, a meal menu item suggestion unit 15, a providing unit 20, and a database 16.

[0024]

The first communication unit 11 transmits the information received from the entrance gate IC card reading unit 3 and the cafeteria IC card reading unit 4 to the information management unit 12. In addition to receiving the information transmitted from the terminal device 300, the first communication unit 11 transmits a mail to an external network 100. The mail is to be sent the meal supplier or the occupational health physician as a notification from the information processing device 10.

[0025]

The information management unit 12 records the information received from the first communication unit 11 in the database 16. Details of recording is described later in a description of the database 16.

[0026]

The meal supply amount estimation unit 13 receives a condition such as a date input to the terminal device 300 by the system user, calculates an estimated meal supply amount for each menu item using the information stored in the database 16, and notifies the meal supplier of the estimated meal supply amount.

[0027]

The health level determination unit 14 determines a health level of the user by using information on nutrient intake of the user recorded in a database 16, and notifies the occupational health physician of the determination result.

[0028]

The meal menu item suggestion unit 15 determines a menu item to be suggested to the user using the information stored in the database 16, and notifies the user of the determined menu item.

[0029]

The providing unit 20 notifies the meal supplier of the estimated meal supply amount calculated by the meal supply amount estimation unit 13.

[0030]

The database 16 includes databases related to the user information 17, cafeteria use information 18, and the attendance information 19.

[0031]

FIG. 5 is a diagram illustrating an example of a database related to the user information 17, and includes information related to “user ID,” “meal records,” “nutrient intake records,” and “cafeteria use information” related to a certain user. The “user ID” is a unique number (identification information) assigned to each user and, for example, a number of 100 is assigned. The “meal records” includes information items of “time” and “menu item ID” indicating when and what the user had or ate in the cafeteria. The “menu item ID” is managed using, for example, the IC tag illustrated in FIG. 4. In the “nutrient intake records,” nutrients included in the meal, which is indicated by the menu item, eaten by the user are recorded together with dates and meal times (for example, breakfast time, lunch time, and dinner time). Items to be recorded include, for example, “calories,” “protein,” “fat,” “carbohydrate,” and “sodium.” The “cafeteria use information” includes information related to using the cafeteria by the user. For example, by recording dates scheduled not to use the cafeteria, such as scheduled dates for business trips or scheduled dates for remote work, the dates on which the user do not use the cafeteria are specified. The “cafeteria use information” may be directly input by the user with the terminal device 300, or may be linked with information in a database of human resources or a database of works.

[0032]

FIG. 6 is a diagram illustrating an example of a database related to the cafeteria use information 18, and includes information related to the “number of cafeteria users” and “menu items.” As the “number of cafeteria users,” records each including a date, a meal time (for example, breakfast time, lunch time, and dinner time), and weather, and the number of users who use the cafeteria at the time in association with each other. The weather may be input by the system user, or information on the weather may be automatically acquired from an external site. The “menu items” has information items of “menu item ID,” “number of served meals,” “nutrients,” and “price,” and the information items are recorded for each menu item. The “menu item ID” is substantially the same as that indicated in FIG. 5. As the “number of served meals,” the number of meals served is recorded along with a date and a meal time (for example, breakfast time, lunch time, dinner time). As the “nutrients,” information on nutrients included in the meal indicated by the menu item is recorded. Items to be recorded are substantially the same as those indicated in FIG. 5, and include, for example, “calories,” “protein,” “fat,” “carbohydrate,” and “sodium.” As the “price,” a price of a menu item is recorded.

[0033]

FIG. 7 is a diagram illustrating an example of a database related to the attendance information 19, and includes information related to “records of attendance” and “current attendance.” As the “records of attendance,” the number of users entering the facility and the number of users leaving the facility are recorded for each time zone (for example, 8:00 in the morning, 12:00 noon, and 18:00 in the evening), along with a date and a time zone, based on the information obtained from the IC card reader 103 placed at the entrance gate. As the “current attendance,” namely as the number of users attending at the facility at a current time, the latest number of the attendance figures is recorded, for example, every 10 minutes.

[0034]

Referring again to FIG. 3, the terminal device 300 includes a second communication unit 302, an operation receiving unit 303, and a display control unit 304 each of which is implemented by a web browser 301. The web browser 301 downloads screen information from the information processing device 10. Each functional unit is implemented by the CPU 501 executing an instruction included in one or more programs included in the downloaded screen information.

[0035]

The second communication unit 302 transmits and receives information on conditions for processing to be executed to and from the information processing device 10. The operation receiving unit 303 receives various operations of the user on various screens displayed on the display 506. The display control unit 304 interprets the screen information of each of the various screens to display a screen on the display 506. The second communication unit 302, the operation receiving unit 303, or the display control unit 304 may be implemented by a native application in alternative to the web browser 301.

[0036]

Process:

FIG. 8 is a flowchart illustrating a process performed by the meal supply amount estimation unit 13. The process is performed in order to determine a meal supply amount to be specified in requesting the meal supplier to supply the meals.

[0037]

The meal supply amount estimation unit 13 receives a condition such as a date input to the terminal device 300 by the system user, calculates an estimated meal supply amount using the information stored in the database 16, and notifies the cafeteria or the meal supplier of the estimated meal supply amount. Each of the steps in the process is described below.

[0038]

S31: The meal supply amount estimation unit 13 receives, as conditions, user inputs of information on, for example, a date and time (for example, breakfast time, lunch time, and dinner time) for which a meal supply amount is to be estimated, a type of menu item (menu item ID) and weather. The user inputs are performed by the system user with the terminal device 300 and received via the operation receiving unit 303. The terminal device 300 may automatically acquire the information on the weather from an external site that predicts weather. More specifically, the second communication unit 302 transmits the input information to the first communication unit 11 of the information processing device 10, and then the first communication unit 11 transmits the received information to the meal supply amount estimation unit 13.

[0039]

S32: With respect to the received conditions, the meal supply amount estimation unit 13 analyzes the information stored in the database 16. When the date and time for which a meal supply amount is to be estimated indicates a current day, data on the current attendance is to be used to estimate the meal supply amount, and the process proceeds to S33. On the other hand, when the date and time for which a meal supply amount is to be estimated does not indicate a current day, the process proceed to S34.

[0040]

S33: The meal supply amount estimation unit 13 acquires attendance figures at a current time from the “current attendance” recorded in the attendance information 19 of the database 16.

[0041]

S34: The meal supply amount estimation unit 13 acquires, for example, attendance figures on the same day of the week and in the same time zone (breakfast time, lunch time, dinner time) of a week before (previous week) from the database 16, and estimates the attendance figures on the date and time for which the meal supply amount is to be estimated. The meal supply amount estimation unit 13 may estimate the attendance figures by using, for example, an average value, a minimum value, or a maximum value of the number of cafeteria users on the same day and in the same time zone (breakfast time, lunch time, dinner time) of former weeks until a week before.

[0042]

S35: The meal supply amount estimation unit 13 acquires information on the number of users who use cafeteria (number of cafeteria users) from the cafeteria use information 18 of the database 16. The information on the number of users to be acquired may vary depending on how the meal supply amount estimation unit 13 estimates a meal supply amount for each of a plurality menu items. For example, in Case 1, which is described later, the number of meals served in the past for each of the plurality of menu items is used.

[0043]

S36: The meal supply amount estimation unit 13 estimates a meal supply amount for each of the plurality of menu items on a specified date and time by using the information acquired in S35. In the following, estimation methods for several cases each of which is under some conditions are described.

[0044]

Case 1: Estimating, by the meal supply amount estimation unit 13, a meal supply amount for each of three menu items, a menu item A, a menu item B, and a menu item C, for lunch time of the current day:

For example, according to the cafeteria use information 18 related to the past, with respect to attendance figures of 1000 that is an example of reference attendance figures, an average meal supply amount (the number of meals served to users) corresponding to the menu item A is for 400, an average meal supply amount corresponding to the menu item B is for 300, an average meal supply amount corresponding to the menu item C is for 200, and an average number of users who do not use the cafeteria is 100. It is assumed that each average is calculated in a predetermined period of time in the past. In the case 1, a ratio of the meal supply amount for each menu item to the attendance figures is as follows:

a ratio of the meal supply amount for the menu item A to the attendance figures is 40%;

a ratio of the meal supply amount for the menu item B to the attendance figures is 30%;

a ratio of the meal supply amount for the menu item C to the attendance figures is 20%; and

a ratio of users who do not use the cafeteria to the attendance figures is 10%.

[0045]

When estimating a meal supply amount for the current day, the meal supply amount estimation unit 13 uses the information on the attendance figures, in particular, attendance figures of the current day, and the ratios described above for the calculation. For example, in case of attendance figures of 1500, a meal supply amount for the menu item A is estimated to be $1500 \times 0.4 = 600$. Alternatively, the meal supply amount estimation unit 13 may simply use the attendance figures of 1000, which is an example of reference attendance figures, that is used for calculating each ratio, for the estimation. In case of the attendance figures of 1500, for example, the meal supply amount estimation unit 13 multiplies each value of the meal supply amount of the corresponding menu item in the case of attendance figures of 1000 by 1.5 ($= 1500 / 1000$).

[0046]

Each calculation for the estimated meal supply amount results in 600 for the menu item A, 450 for the menu item B, 300 for the menu item C, and the number of users who do not use the cafeteria being 150.

[0047]

In addition, the estimated meal supply amount of each menu item is to be updated daily. When the meal supply amount estimation unit 13 estimates a meal supply amount for lunch time on the current day, attendance figures at a time before the meal time for lunch, for example 10:00 on the current day, is used. This is because time for cooking or preparing is taken into account. Accordingly, attendance figures at a time that is same as the time for which the meal supply amount estimation unit 13 is to estimate the meal supply amount may be used as the reference attendance figures used to obtain the ratios related to meal supply amounts for the plurality of meal menu items (meal supply amount ratios).

[0048]

In a case where the meal supply amount estimation unit 13 estimates a meal supply amount for one of following days in the future instead of the current day, an average value of the “records of attendance” of the attendance information 19 or an average value of the “number of cafeteria users” of the cafeteria use information 18 in the database 16 may be used. In addition, the estimation may be performed by taking into account what is described related to the following cases.

[0049]

Although the method of estimating the meal supply amount is described in terms above, machine learning may be used. For example, the estimated meal supply amount may be obtained by regression using the estimated meal supply amount for each menu item as an objective function, the attendance figures, the weather, the day of the week, and the like as explanatory variables. In addition, or alternatively, deep learning may be used to input the attendance figures, the weather, the day of the week, and the like, and to output the estimated meal supply amount for each menu item.

[0050]

Machine learning is a technique for causing a computer to acquire human-like learning capability, and refers to a technique in which a computer autonomously generates an algorithm to be used for determination of data identification or the like from learning data acquired in advance, and applies the algorithm to new data to perform prediction. Any suitable learning method is applied for machine learning, for example, any one of supervised learning, unsupervised learning, semi-supervised learning, reinforcement learning, and deep learning, or a combination of two or more those learning.

[0051]

Case 2: Taking Day Of Week Into Account:

The meal supply amount estimation unit 13 acquires the attendance figures in the past for each day of the week from the database 16, and calculates the ratios, which are related to meal supply amounts for the plurality of meal menu items (meal supply amount ratios), for each day

of the week as in the case 1. In case of estimating the meal supply amount for the current day, the meal supply amount estimation unit 13 estimates the meal supply amount for each of the plurality of menu items by multiplying the corresponding meal supply amount ratio of the day of the week corresponding to the current day by attendance figures of the current day. In case of estimating the meal supply amount for a day other than the current day, the meal supply amount estimation unit 13 estimates the meal supply amount for each of the plurality of menu items by multiplying, by the attendance figures estimated in the above-described step, the corresponding meal supply amount ratio of the day of the week corresponding to the day for which the meal amount is to be estimated.

[0052]

The meal supply amount estimation unit 13 calculates the number of users who do not use the cafeteria by subtracting the number of cafeteria users from the attendance figures. In the case 1 or the case 2, the meal supply amount estimation unit 13 may estimate the meal supply amount for each of the plurality of menu items after subtracting the number of users who do not use the cafeteria from the attendance figures.

[0053]

Case 3: Taking Weather Into Account:

For example, a factor that has effects on a trend toward using the cafeteria, for example a rainy day, are to be reflected on the estimation. For example, among the attendance figures of 1000, which is an example of reference attendance figures, approximately 800 users use the cafeteria on sunny days, and approximately 900 users use the cafeteria on rainy days due to avoiding going out for having meals, namely more users uses the cafeteria on rainy days. Such matters are used to obtain a value of the estimation. The meal supply amount estimation unit 13 calculates an average of ratios of the number of cafeteria users to attendance figures for each type of weather. The meal supply amount estimation unit 13 obtains the number of prospective users by multiplying the attendance figures of the current day by the ratio calculated for each type of weather. By regarding the number of prospective users as the attendance figures, the estimated meal supply amount for each of the plurality of the menu items is obtainable in substantially the same manner as the case 1 or the case 2.

[0054]

Alternatively, the meal supply amount estimation unit 13 may calculate the ratio described in the case 1 for each type of weather by using information on the weather in the past included in the cafeteria use information 18. The meal supply amount estimation unit 13 estimates the meal supply amount for each of the plurality of menu items for each type of weather from the attendance figures.

[0055]

In addition, since it is considered that the trend toward using the cafeteria in relation to the weather varies for each facility, the database 16 may be generated for each facility to perform the estimation.

[0056]

Case 4: Taking Individual Inclination Into Account:

The meal supply amount estimation unit 13 uses, for the estimation, an inclination of an individual user such as, for example, an inclination of a user to order the same menu item every day, an inclination of a user to change a menu item for meal depending on a day of the week, or an inclination of a user to order a menu item including fish. By accumulating the inclinations of each user, an estimated value by using the inclinations of each user is obtainable, instead of by simply using values of the attendance figures.

[0057]

A description is given of an example of a process of simply predicting a menu item that is to be ordered by an individual user. For easy understanding, in the following description of the example of the process, a single person orders a single menu item for a single meal. The meal supply amount estimation unit 13 obtains statistics of the menu items ordered by each user and for each day of the week, for example. It is assumed that the statistics in relation to the menu items ordered by a certain user orders, or eats, a day of the week corresponding to a current day (for example, Monday) have the following ratios based on the cafeteria use information 18.

Menu item A, a%;

Menu item B, b%;

Menu item C, c%;

Menu item D, d%; and

others, z%.

Although each of a% to z% is less than 100, the ratios calculated for each of the users who enter to the facility from the entrance gate are added up and divided by 100 for each of the plurality of menu items to obtain the number of users who orders each of the plurality of menu items (corresponding to the meal supply amount for each menu item).

[0058]

Note that the meal supply amount estimation unit 13 may weight the above-described ratios depending on the weather. In other words, when a probability that the users use the cafeteria varies depending on the weather, the ratios for each menu item may be modified. For example, if it is assumed that the probability that the users use the cafeteria is rainy day k1%, cloudy day k2%, sunny day k3%, and snowy day k4%, a% of rainy day is modified to $k1 \times a\%$.

[0059]

In case that a single person orders two or more menu items for a single meal, the ratio calculated for each of the users who enter to the facility from the entrance gate may be added up, but not divided by 100, for each of the plurality of menu items.

[0060]

A description is given below of a method of predicting a probability that a menu item having a dish including a specific ingredient such as fish or meat is ordered by an individual user, namely that an individual user eats a meal of a menu item having a dish including a specific

ingredient such as fish or meat. In this case, it is assumed that each of the plurality of menu items in the cafeteria use information 18 is associated with a large category of ingredients including, for example, a fish dish, a meat dish, and both of a fish dish and a meat dish, and a small category of ingredients including, for example, beef, pork, chicken, horse mackerel, yellowtail, shrimp, and shellfish. The meal supply amount estimation unit 13 generates a histogram for each ingredient from the user information 17 in the past for each individual user. The meal supply amount estimation unit 13 may generate a histogram for each day of the week or each type of weather. The meal supply amount estimation unit 13 predicts that an individual user eats ingredients corresponding to the top N in the histogram, and compares the ingredients corresponding to the top N in the histogram with ingredients used in each menu item for a day (or each regular menu item). For example, beef is used in beef curry, and if beef is included in the top N ingredients of the histogram, the meal supply amount estimation unit 13 determines that there is a probability that the corresponding individual user orders the beef curry. The meal supply amount estimation unit 13 sets, for example, a weighting factor of 1 in total to the top N ingredients to obtain the probability of each menu item that is to be ordered, or eaten, (in case that a single person orders two or more menu items for a single meal). In case that a single person orders two or more menu items for a single meal, the meal supply amount estimation unit 13 determines how many menu items each person orders in average, and sets a weight corresponding to the average value in total to the top N ingredients. [0061]

Machine learning may also be used for the individual user-based prediction. For example, in deep learning, a learning device predicts a correspondence between observation data and teacher data for each individual user by using learning data including data on a day of the week, weather, temperature, humidity, and the like as the observation data and data on a menu item actually eaten by an individual user in the past as the teacher data. If the data on the day of the week, weather, temperature, or humidity of a day for which a menu item to be eaten by an individual user is to be predicted is obtained, the learning device can output the probability that each menu item to be ordered, or eaten.

[0062]

Then, for example, the meal supply amount estimation unit 13 also uses information on a scheduled date for a business trip or a scheduled date for remote work included in the “cafeteria use information” of the user information 17 of the database 16, and if a user who orders the same menu item every day is scheduled to have a business trip or remote work on a certain day, the meal supply amount estimation unit 13 reduces the estimated number of meals to be served (estimated meal supply amount) of the corresponding menu item for the certain day. In addition, when a user who orders a menu item having a dish using fish is scheduled to have a business trip or work as remote work, the estimated number of meals to be served (estimated meal supply amount) of the corresponding menu item, which has a dish using fish, is reduced.

[0063]

S37: The providing unit 20 notifies the cafeteria or the meal supplier of the estimated meal supply amount for each menu item calculated in S35. The notification may be made by mail, or may be displayed on a predetermined site and an access destination of the site may be sent by mail.

[0064]

The process described above is executed by the meal supply amount estimation unit 13. According to the received the estimated meal supply amount for each menu item, the meal supplier can adjust the number of meals to be supplied, resulting in improving work efficiency, or reducing food loss, for example.

[0065]

Determination of Health Level Using User Information:

A description is given below of determining a health level by using the user information 17, with reference to FIG. 9. For example, a regular health checkup is taken as opportunity to perform a process illustrated in FIG. 9. FIG. 9 is a flowchart illustrating an example of a process performed by the health level determination unit 14. Each of the steps in the process is described below.

[0066]

S41: The health level determination unit 14 acquires information recorded in the “nutrient intake records” of the user information 17 in the database 16. Users for which the information is to be acquired may be all users, or may be users who are specified by the system user with the terminal device 300.

[0067]

S42: The health level determination unit 14 analyzes the nutrient intake amount of each user using the acquired information. For example, the average intake per meal of each item of “calories,” “protein,” “fat,” “carbohydrate,” and “sodium” is calculated and compared with a reference value, a user who is suspected to be unhealthy (having a problem in health) is specified based on whether the average intake exceeds or is below a predetermined threshold value.

[0068]

S43: The health level determination unit 14 reports the results of the analysis in S42 to the occupational health physician. The notification may be made by mail, or may be displayed on a predetermined site and an access destination of the site may be sent by mail. In addition, the results of all the users may be notified to the occupational health physician, or the results of the users specified as having a health problem among all the users may be notified to the occupational health physician.

[0069]

The process described above is executed by the health level determination unit 14. Based on the notified information, the occupational health physician can give advice on an appropriate meal to the user.

[0070]

Suggestion of Meal Menu Item:

FIG. 10 is a flowchart illustrating an example of a process performed by the meal menu item suggestion unit 15. The process of FIG. 10 is periodically performed before lunch time or dinner time, for example. The estimated supply amount obtained by the meal supply amount estimation unit 13 is used for the process. Due to this, for example, in case of lunch, the process is preferably performed at a time after almost all the users enters the facility (for example, 10:00). Although, the later the time to perform the process is, the more accurate the attendance figures at the time of the meal is, there is a limitation because time for preparing meals at the cafeteria is to be taken into account. The same applies to the case of dinner, and the process may be performed at a time after users who regularly leaves the office (facility) early leave the office (for example, 16:00).

[0071]

Each of the steps in the process of suggesting, for a following day, a meal menu item (among from Menu item A, Menu item B, and Menu item C, which are scheduled to be in a menu for the following day) is described below.

[0072]

S51: The meal menu item suggestion unit 15 acquires an estimated supply amount for each menu item for the following day. For example, the estimated meal supply amount obtained by the meal supply amount estimation unit 13 is used.

[0073]

S52: The meal menu item suggestion unit 15 acquires an available supply amount for each menu item for the following day. For example, the available supply amount is input by the system user with the terminal device 300 to be obtained.

[0074]

S53: The meal menu item suggestion unit 15 acquires information on a user who is to be notified of suggestions for health. For example, as such the information, information on a user who is determined to have a health problem by the health level determination unit 14 is obtained

[0075]

S54: The meal menu item suggestion unit 15 acquires information on nutrients for each menu item from the database 16.

[0076]

S55: The meal menu item suggestion unit 15 determines whether there is a menu item of which the supply amount is insufficient by comparing the estimated supply amount of the menu item acquired in S51 with the available supply amount of the menu item acquired in S52, and the process proceeds to S56 when there is such a menu item, otherwise, namely there is not such a menu item, the process proceeds to S59. It is conceivable that the cafeteria prepares meals corresponding to the estimated meal supply amount estimated by the meal supply amount estimation unit 13. Accordingly, in case of, for example, a shortage of an

ingredient, the available supply amount for each menu item is limited and less than the estimated meal supply amount.

[0077]

S56: The meal menu item suggestion unit 15 determines a menu item to be suggested, by checking whether the health level of each user who is to be notified of suggestions for health is to be improved by changing from a menu item of which the supply amount is insufficient to another menu item. The meal menu item suggestion unit 15 specifies a nutrient having the largest excess amount among “calories,” “protein,” “fat,” “carbohydrate,” and “sodium” for each user who is to be notified suggestions for health. For a user whose calorie intake indicates the greatest excess amount among the nutrients, the meal menu item suggestion unit 15 specifies a menu item with which calorie intake is reduced, and suggests the menu item when the calories of the menu item is less than that of the menu item of which the supply amount is insufficient. Note that the meal menu item suggestion unit 15 may specify a nutrient of which the excess amount is the second greatest or the third greatest, for example, and suggest another menu item in substantially the same manner.

[0078]

The meal menu item suggestion unit 15 performs the above described processing for each of all users who are to be notified of suggestions for health, and determines whether there is still the menu item of which the supply amount is insufficient. When there is still the menu item of which the supply amount is insufficient, the meal menu item suggestion unit 15 further makes a similar suggestion to a user who is determined as one having potential to have a health problem in the future by the health level determination unit 14.

[0079]

When there are a plurality of menu items to be suggested, the meal menu item suggestion unit 15 may suggest all of the menu items or may limit the number of menu items to be suggested in descending order of the effect.

[0080]

S57: The meal menu item suggestion unit 15 determines menu items to be suggested to all users other than the users who are to be notified of suggestions for health. For example, all the menu items other than the menu item of which the supply amount is insufficient may be suggested to all the users other than the users who are to be notified of suggestions for health, or the number of menu items to be suggested may be limited by being suggested in descending order of the amount obtained by subtracting the estimated supply amount from the available supply amount.

[0081]

S58: The meal menu item suggestion unit 15 notifies each user of the menu item determined in S56 and in S57. The notification may be made by mail, or may be displayed on a predetermined site and an access destination of the site may be sent by mail. In addition, a notification may set not to be sent to a user who does not use the cafeteria, because of a business trip or a remote work scheduled on the following day.

[0082]

FIG. 11 is a diagram illustrating an example of a notification of a menu item by mail. The user can consider the suggestion of a menu item for his or her meal for the day with reference to the mail. The mail may include an image of a menu item, for example, or nutrients such as calories may be displayed in the mail.

[0083]

The process is further described below, with reference to FIG. 10. S59: The meal menu item suggestion unit 15 determines a menu item for improving a health level for each of the users who are to be notified of suggestions for health. Similar to the processing of S56, for example, a user whose calorie intake exceeds the reference value, the meal menu item suggestion unit 15 suggests a menu item having a low calorie. When there are a plurality of menu items to be suggested, the meal menu item suggestion unit 15 may suggest all of the menu items or may limit the number of menu items to be suggested in descending order of the effect. Unlike the processing of S56, there is no need to take into account a shortage of the supply amount, but a shortage of the supply amount caused by accepting the suggested menu item is to be avoided.

[0084]

S60: The meal menu item suggestion unit 15 notifies each user who is to be notified suggestions for health of the menu item determined in S59. The notification may be made by mail, or may be displayed on a predetermined site and an access destination of the site may be sent by mail. In addition, a notification may set not to be sent to a user who does not use the cafeteria, because of a business trip or a remote work scheduled on the following day.

[0085]

According to the above-described embodiment of the present disclosure, the number of meals to be served for each menu item is estimated with high accuracy by using the cafeteria use information stored in the database or the information on use tendency of individual user stored in the database, and the estimated number of meals to be served is notified to the meal supplier. In addition, based on the meal records of a user, a determination result indicating a health level of the user is notified to the occupational health physician. In addition, a menu item is suggested to a user for his or her meal by taking into account a shortage of the meal supply amount or a health level of the user.

[0086]

Second Embodiment:

System Configuration:

A description is given below of a second embodiment of the present disclosure. In the drawings to be referred in the following description, the same reference numerals are given to the same components, and redundant explanation may be omitted in the following description. In the second embodiment, systems being external to the information processing system 1 perform entry and exit management of users (access control of users with respect to the facility, entering and leaving the facility of users) and use of the cafeteria by users, estimate a

meal supply amount based on data on attendance (entering and leaving the facility) and data on use of the cafeteria, determines a health level, and suggest a meal menu item. The information processing system 1 acquires, for example, facility access data of a user or cafeteria use data of a user from each system being outside, and transmits appropriate data to each of systems that perform estimation of a meal supply amount, determination of a health level, and suggestion of a meal menu item, for example.

[0087]

FIG. 12 is a diagram illustrating an overview of an information processing system 1 according to a second embodiment of the disclosure. In the present embodiment, users (employees) of a single company use services provided by the system. The results of the health checkup performed on the employees of the company are managed by a health checkup system 82 and stored in the health checkup database (DB) 92. In addition, an activity amount (such as the number of steps) of each employee is measured by using a portable terminal 305 such as a smartphone provided to the employee.

[0088]

A cafeteria management system 80 reads an IC card of each user who uses the cafeteria by using the IC card reader 104 and stores information on the use of the cafeteria (cafeteria use information) in a cafeteria management DB 90 for management.

[0089]

An entry/exit management system 81 reads an IC card of each user who enters or leaves the facility by using the IC card reader 103, and stores information on entry and exit in a facility access DB 91 for management.

[0090]

The information processing system 1 acquires cafeteria use data 70 and meal menu item data 71 from the cafeteria management system 80, and acquires entry/exit data (facility access data) 72 from the entry/exit management system 81. In addition, the information processing system 1 acquires information on the activity amount measured by the portable terminal 305 from the portable terminal 305 as biological data 73. Further, the information processing system 1 transmits appropriate data to each of a meal usage amount estimation system 84, a health level determination system 85, and a meal menu item suggestion system 86. A detailed description of data acquired from each of the systems by the information processing system 1 and data transmitted to each of the systems is given later.

[0091]

The meal usage amount estimation system 84 estimates an amount corresponding to meals to be served, by using the data received from the information processing system 1 and presents to the meal supplier the estimated meal amount to be served. The meal supplier presents to the cafeteria management system 80 a meal supply amount for each meal menu determined based on the received estimated served meal amount.

[0092]

The health level determination system 85 determines a health level of an employee by using the data received from the information processing system 1, and notifies the information processing system 1 and the occupational health physician of a determination result.

[0093]

The meal menu item suggestion system 86 suggests a meal menu item to a user using the data received from the information processing system 1.

[0094]

The presentation, the notification, and the suggestion to the meal supplier, the occupational health physician, and the user, respectively, are performed by transmitting an e-mail, for example. Alternatively, the meal supplier, the occupational health physician, and the user may operate the terminal device 300 to access a predetermined site for check the information.

[0095]

Functions:

A description is given below of a functional configuration of the information processing system 1 according to the second embodiment with reference to FIG. 13. FIG. 13 is a diagram illustrating an example of a functional configuration of the information processing system 1 according to the second embodiment. The information processing device 10 included in the information processing system 1 includes a first communication unit 11, an acquisition unit 60, and an analysis unit 61. Note that a hardware configuration of the information processing device 10 is substantially the same as that described in the first embodiment with reference to FIG. 2. Each of these functional units is implemented by the CPU 501 of FIG. 2 executing an instruction included in one or more programs installed in the information processing device 10. The storage unit 62 included in the information processing device 10 may be implemented by, for example, a storage device such as the HD 504 of FIG. 2. A description is given below of each functional unit.

[0096]

The first communication unit 11 transmits or receives information to or from each system in the external network 100. A detailed description of the information to be transmitted or received is given later. In addition, the first communication unit 11 transmits an e-mail in relation to the notification, the presentation, or the suggestion to an e-mail address of the occupational health physician, the meal supplier, or the user.

[0097]

The acquisition unit 60 acquires data from each external system. For example, the acquisition unit 60 acquires the cafeteria use data 70 and the meal menu item data 71 from the cafeteria management system 80. Further, the acquisition unit 60 acquires the entry/exit data 72 from the entry/exit management system 81.

[0098]

The analysis unit 61 analyzes the data acquired from one of the external systems and obtains data to be transmitted to another one of the external systems. For example, the analysis unit 61 uses the entry/exit data 72 acquired from the entry/exit management system 81 to generate

a list of employee IDs, and calculates the number of employees in the building (the attendance figures). Alternatively, the analysis unit 61 calculates an estimated value of an appropriate energy amount by using the activity amount and the health checkup data 74 received from the portable terminal 305.

[0099]

The storage unit 62 stores the data acquired from each external system and the data obtained by analysis or calculation performed by the analysis unit 61.

[0100]

Process:

FIG. 14A and FIG. 14B are a sequence diagram illustrating an example of a process according to the second embodiment. Each of the steps in the process is described below.

[0101]

S200: The meal supplier determines a time at which the information processing system 1 starts data acquisition from the entry/exit management system 81, the cafeteria management system 80, and the health checkup system 82. The meal supplier determines the time in consideration of the fact that data updated after the determined time is not available to be used. In order to set the determined time with the information processing system 1, for example, the meal supplier transmits a data acquisition time setting request to the first communication unit 11 of the information processing device 10 by operating the terminal device 300. The first communication unit 11 of the information processing system 1 receives the data acquisition time setting request from the terminal device 300.

[0102]

S201: The first communication unit 11 transmits to the terminal device 300 a response indicating that the setting of the time to start acquiring the data has been completed.

[0103]

S202: After the set time has come, the acquisition unit 60 of the information processing system 1 transmits a request message for requesting for the entry/exit data 72 to the entry/exit management system 81.

[0104]

S203: The acquisition unit 60 of the information processing device 10 receives the entry/exit data 72 transmitted by the entry/exit management system 81. FIG. 15 is a diagram illustrating an example of the entry/exit data 72 according to the second embodiment. The entry/exit data 72 illustrated in FIG. 15 includes information items of “company ID,” “employee ID,” “entry date and time,” and “exit date and time.” The “company ID” and the “employee ID” are identification information assigned to identify a company and an employee, respectively. The “entry date and time” and the “exit date and time” are a date and time when an employee enters the facility such as a building including a plurality of business offices of a company and a date and time when an employee leaves the facility, respectively. Referring again to FIG. 14 (FIG. 14A and FIG. 14B), a further description is given below.

[0105]

S204: The analysis unit 61 of the information processing device 10 generates a list of employee IDs of employees presenting in the facility using the acquired entry/exit data 72, and further calculates the number of employees being in the facility (referred to as a current attendance figures). The storage unit 62 of the information processing device 10 stores the acquired entry/exit data 72, the list generated by the analysis unit 61, and the current attendance figures.

[0106]

S205: The acquisition unit 60 of the information processing system 1 transmits to the cafeteria management system 80 a request message requesting for the cafeteria use data 70. The request message to be transmitted includes the list of employee IDs generated in S204. In other words, with the request message, the cafeteria use data 70 corresponding to the employees included in the list is requested.

[0107]

S206: The acquisition unit 60 of the information processing device 10 receives the cafeteria use data 70 transmitted from the cafeteria management system 80. The storage unit 62 of the information processing device 10 stores the acquired cafeteria use data 70. FIG. 16 is a diagram illustrating an example of the cafeteria use data 70 according to the second embodiment. The cafeteria use data 70 illustrated in FIG. 16 includes information items of “employee ID,” date and time (“use date and time”), and “menu item ID.” The “use date and time” indicates when an employee identified by the “employee ID” used the cafeteria. The “menu item ID” identifies one or more menu items that was used (namely, ordered or eaten) by the employee identified by the employee ID. The “menu item ID” is identification information assigned to identify one of the plurality of menu items available in the cafeteria, similarly to the “menu item ID” illustrated in FIG. 5. Referring again to FIG. 14 (FIG. 14A and FIG. 14B), a further description is given below.

[0108]

S207: The acquisition unit 60 of the information processing system 1 transmits to the cafeteria management system 80 a request message requesting for the meal menu item data 71.

[0109]

S208: The acquisition unit 60 of the information processing device 10 receives the meal menu item data 71 transmitted from the cafeteria management system 80. The storage unit 62 of the information processing device 10 stores the acquired meal menu item data 71. FIG. 17 is a diagram illustrating an example of meal menu item data 71 according to the second embodiment. The meal menu item data 71 illustrated in FIG. 17 includes information items of “number of sales,” “price,” and “calories” corresponding to a meal menu item identified by the associated “menu item ID.” In addition, the meal menu item data 71 includes information items of “protein,” “fat,” “carbohydrate,” and “sodium” each of which is component included in the menu item and indicating a corresponding amount. Referring again to FIG. 14 (FIG. 14A and FIG. 14B), a further description is given below.

[0110]

S209: The acquisition unit 60 of the information processing system 1 transmits to the health checkup system 82 a request message requesting for the health checkup data 74.

[0111]

S210: The acquisition unit 60 of the information processing device 10 receives the health checkup data 74 transmitted from the health checkup system 82. The storage unit 62 of the information processing device 10 stores the acquired health checkup data 74. FIG. 18 is a diagram illustrating an example of health checkup data 74 according to the second embodiment. The health checkup data 74 illustrated in FIG. 18 includes information items of “age,” “height,” “weight,” and “blood glucose level” of the employee identified by “employee ID.” Referring again to FIG. 14 (FIG. 14A and FIG. 14B), a further description is given below.

[0112]

S211: The acquisition unit 60 of the information processing device 10 refers to the list generated in S204, and transmits to the portable terminal 305 a request message requesting information on the activity amount measured by the portable terminal 305 of the employee who is presenting in the facility.

[0113]

S212: The acquisition unit 60 of the information processing device 10 receives the information on the activity amount transmitted from the portable terminal 305.

[0114]

S213: The analysis unit 61 of the information processing device 10 calculates an estimated value of the energy requirement of each employee by using the received activity amount and the health checkup data 74 acquired in the S210. As an example of the calculation method, in a case where the activity amount is the number of steps, a travel distance is estimated based on a step length estimated by the “height” included in the health checkup data 74, and an energy amount determined based on the “weight” and the travel distance is set as an energy requirement. By repeating the processing of S211 to S213, the estimated value of the energy requirement for each of all employees presenting in the facility is calculated.

[0115]

S214: The storage unit 62 of the information processing device 10 stores the employee ID and the energy requirement calculated in S213 in association with each other. For example, the storage unit 62 stores the activity amount and the energy requirement acquired in S212 as the biometric data. FIG. 19 is a diagram illustrating an example of biological data (1) according to the second embodiment. The biological data 73 illustrated in FIG. 19 includes information items of “employee ID,” “reception date and time,” “number of steps,” and “energy requirement.” The information items are the number of steps of the employee corresponding to the employee ID received by the acquisition unit 60, the reception date and time indicating when the activity amount (number of steps) is received, and the energy requirement calculated by the analysis unit 61 in the processing of S211 to S213.

[0116]

S215: The first communication unit 11 of the information processing device 10 transmits to the meal usage amount estimation system 84 a request message for estimating a meal amount to be served. The request message includes the attendance figures, cafeteria use data 70, and meal menu item data 71 as information to be used for estimating the meal amount to be served.

[0117]

S216: The meal usage amount estimation system 84 uses the received information to estimate the meal amount to be served. The estimation method is substantially the same as the method described in the first embodiment.

[0118]

S217: The meal usage amount estimation system 84 transmits to the first communication unit 11 of the information processing device 10, a response message notifying that the estimation of meal amount to be amount has been executed. The meal usage amount estimation system 84 may include information on the estimated meal amount to be served in the response message.

[0119]

S218: The meal usage amount estimation system 84 notifies the meal supplier of the meal amount to be served. As a notification method, for example, an e-mail including information on the meal amount to be served is transmitted to the mail address of the meal supplier.

[0120]

S219: The first communication unit 11 of the information processing device 10 transmits to the health level determination system 85 a request message for executing a determination of a health level. The request message includes the cafeteria use data 70 and health checkup data 74 as information to be used for determining the health level.

[0121]

S220: The health level determination system 85 determines the health level by using the received information. The determination method is substantially the same as the method described in the first embodiment.

[0122]

S221: The health level determination system 85 notifies the occupational health physician of the determination result. As a notification method, for example, an e-mail including information on a determination result is transmitted to an e-mail address of the occupational health physician.

[0123]

S222: The health level determination system 85 transmits to the first communication unit 11 of the information processing device 10, a response message notifying that the determination of the health level has been executed. The response message includes information on the determination result.

[0124]

S223: The first communication unit 11 of the information processing device 10 transmits to the meal menu item suggestion system 86 a request message requesting to determine a meal menu item to be suggested. The request message includes, as information to be used for determining a meal menu item to be suggested, the cafeteria use data 70, the meal menu item data 71, the health checkup data 74, the energy requirement estimated in S213, and the determination result of the health level determined in S220.

[0125]

S224: The meal menu item suggestion system 86 transmits to the first communication unit 11 of the information processing device 10, a response message notifying that the determination of meal menu item to be suggested has been executed. The meal menu item suggestion system 86 may include information on the determined meal menu item for suggestion in the response message.

[0126]

S225: The meal menu item suggestion system 86 notifies each employee of the corresponding determined meal menu item for suggestion. As a notification method, for example, an e-mail including information on the meal menu item to be suggested is transmitted to an e-mail address of each employee.

[0127]

As described above, with the information processing system 1 according to the second embodiment in which each of all functions and services of managing entry and exit to the facility, managing use of the cafeteria (performing access control with respect to the facility and the cafeteria), estimating a meal supply amount, determining a health level, and suggesting a meal menu item is implemented by an independent system external to the information processing system 1, all functions and services are available. This is because the information processing system 1 acquires data from one of the external systems and transmits data to one of the external systems as appropriate, thereby implementing cooperation of functions and services provided by the external systems.

[0128]

Furthermore, the information processing system 1 according to the second embodiment of the present disclosure acquires the health checkup data and information on an activity amount (the number of steps) received from a portable terminal, thereby suggesting a meal menu item by taking energy consumption of an individual user into account.

Third Embodiment System Configuration:

A description is given below of a third embodiment of the present disclosure. In particular, differences from the second embodiment is described below. FIG. 20 is a diagram illustrating an example of a configuration of an information processing system 1 according to a third embodiment. In the present embodiment, a complex facility in which a plurality of companies presents. In a complex facility, from a point of view of security, the health checkup data for each company may not be acquired. To cope with this, data managed by a fitness gym in the complex facility is used. Each company has a contract to use a fitness gym

system 83, and an employee ID is used as identification information for identifying each user of the fitness gym. Data on the each of the users of the fitness gym is stored in a personal information DB 93 managed by the fitness gym system 83. The information processing system 1 acquires personal information DB 93 from the fitness gym system 83, and uses the acquired data to estimate an energy requirement for each of the users. Further, the information processing system 1 transmits the estimated energy requirement to one of the external systems that determines a meal menu item to be suggested. The information processing system 1 according to the third embodiment does not acquire data from the health checkup system 82 or the portable terminal 305 owned by each employee.

[0129]

Process:

FIG. 21A and FIG. 21B are a sequence diagram illustrating an example of a process according to the third embodiment. Regarding the processing of each step, differences from the second embodiment are described below.

[0130]

The processing of S200 to S208 is substantially the same as that in the second embodiment.

[0131]

S209-1: The acquisition unit 60 of the information processing system 1000 transmits a request message requesting personal information data 76 to the fitness gym system 83.

[0132]

S210-1: The acquisition unit 60 of the information processing device 10 receives the personal information data 76 transmitted from the fitness gym system 83. The storage unit 62 of the information processing device 10 stores the acquired personal information data 76.

[0133]

S213-1: The analysis unit 61 of the information processing device 10 calculates an estimated value of the energy requirement by using the received personal information data 76. As a calculation method, for example, the energy requirement is estimated based on the basal metabolic rate estimated from “age,” “weight,” and “muscle mass” included in the personal information data 76. The analysis unit 61 calculates an estimated value of the energy requirement for each of all employees presenting in the facility.

[0134]

S214-1: The storage unit 62 of the information processing device 10 stores the employee ID and the energy requirement calculated in S213 in association with each other. For example, the storage unit 62 stores the personal information data 76 and the energy requirement acquired in S212 as a biological data 75. FIG. 22 is a diagram illustrating an example of biological data (2) according to the third embodiment. The biological data 75 illustrated in FIG. 22 includes information items of “employee ID,” “measurement date,” “age,” “height,” “weight,” “body fat percentage,” “muscle mass,” and “energy requirement.” The information items are obtained from the personal information data 76 received by the acquisition unit 60

or the energy requirement calculated by the analysis unit 61. Referring again to FIG. 21 (FIG. 21A and FIG. 21B), a further description is given below.

[0135]

The processing of S215 to S225 is substantially similar to or the same as that in the second embodiment except that the personal information data 76 is used in alternative to the health checkup data 74 when the health level and the meal menu item for the suggestion are determined.

[0136]

As described above, with the information processing system 1 according to the third embodiment in which a plurality of companies are in the same facility and plural functions providing various services are implemented by systems external to and independent of the information processing system 1, all functions and services are available. This is because the information processing system 1 acquires data from one of the external systems and transmits data to one of the external systems as appropriate, thereby implementing cooperation of functions and services provided by the external systems.

[0137]

Furthermore, the information processing system 1 according to the third embodiment of the present disclosure acquires data from a fitness gym, thereby a meal menu item is to be suggested by taking into account the energy consumption for each individual user.

Fourth Embodiment System Configuration:

A description is given below of a fourth embodiment of the present disclosure. In particular, differences from the third embodiment is described below. FIG. 23 is a diagram illustrating an example of a configuration of an information processing system 1 according to a fourth embodiment. In the present embodiment, in a complex facility where a plurality of companies presents, the information processing system estimates operating days for each of the plurality of companies by using entry record data and notifies a meal supplier of the estimated operating days. In the present embodiment, the information processing system 1 does not acquire data of the personal information DB 93 from the fitness gym system 83 and does not estimate the energy requirement.

[0138]

Process:

FIG. 24A and FIG. 24B are a sequence diagram illustrating an example of a process according to the fourth embodiment. Regarding the processing of each step, differences from the third embodiment are described below.

[0139] The processing of S200 and S201 is substantially the same as that in the third embodiment.

[0140]

S230: The meal supplier sets a date and time at which the information processing system 1 notifies the meal supplier of the operating days of each company. In order to set the determined time with the information processing system 1, for example, the meal supplier

operates the terminal device 300 to transmit to the first communication unit 11 of the information processing device 10 a request for setting a notification day and time of operating days. The first communication unit 11 of the information processing system 1 receives from the terminal device 300 the request for setting a notification day and time of operating days.

[0141]

S231: The first communication unit 11 transmits to the terminal device 300 a response indicating that the setting of a notification date and time of operating days has been completed.

[0142]

The processing of S202 and S208 is substantially the same as that in the third embodiment.

[0143]

S232: The analysis unit 61 of the information processing device 10 uses the entry/exit data 72 acquired in S203 to generate the entry record data 77 that includes information on entry dates and times. The storage unit 62 of the information processing device 10 stores the generated entry record data 77. FIG. 25 is a diagram illustrating an example of the entry record data 77 according to the fourth embodiment. The entry record data 77 illustrated in FIG. 25 includes information items of “company ID” that is identification information for identifying a company, “employee ID” that is identification information for identifying an employee, and “entry date and time” that indicates a date and time when the employee entered the facility. Referring again to FIG. 24 (FIG. 24A and FIG. 24B), a further description is given below.

[0144]

S233: The analysis unit 61 of the information processing device 10 estimates operating days for each company by using the entry record data 77. As an estimation method, for example, a day on which the attendance figures are greater than or equal to a predetermined number is regarded as an operating day. The storage unit 62 of the information processing device 10 stores the information on the operating days as the acquired operating day data 78. FIG. 26 is a diagram illustrating an example of operating day data 78 according to the fourth embodiment. The operating day data 78 illustrated in FIG. 26 includes information items of “company ID” that is identification information for identifying a company and “operating days” that indicates predicted operating days.

[0145]

S234: The information processing device 10 notifies the meal supplier of the operating days of each company. As a notification method, for example, the first communication unit 11 of the information processing device 10 transmits an e-mail including the information on operating days of each company to a mail address of a meal supplier.

[0146]

The processing of S215 to S225 is substantially similar to or the same as that in the third embodiment except that the personal information data 76 and the energy requirement are not used to determine the health level and the meal menu item for the suggestion.

[0147]

As described above, with the information processing system 1 according to the fourth embodiment in which a plurality of companies are in the same facility and plural functions providing various services are implemented by systems external to and independent of the information processing system 1, all functions and services are available. This is because the information processing system 1 acquires data from one of the external systems and transmits data to one of the external systems as appropriate, thereby implementing cooperation of functions and services provided by the external systems.

[0148]

Furthermore, the information processing system 1 according to the fourth embodiment of the present disclosure estimates operating days for each company by using the entry record data, and thereby notifying the meal supplier of the estimated operating days. The information on the operating days of each company allows the meal supplier to estimate the meal amount required to be supplied to the cafeteria with a high accuracy, resulting in reducing food loss.

[0149]

The above-described embodiments are illustrative and do not limit the present disclosure. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of the present disclosure. Thus, numerous additional modifications and variations are possible in light of the above teachings.

[0150]

For example, the configuration example of the functional block diagram of FIG. 3 and FIG. 13 is divided according to the main functions in order to facilitate understanding of the processing by the information processing system 1 and the information processing device 10. Each processing unit or each specific name of the processing unit is not to limit a scope of the present disclosure. The processing of the information processing system 1 and the information processing device 10 may be divided into more processing units according to the processing content. Further, one process may be divided to include a larger number of processes.

[0151]

Each of the functions of the above-described embodiments may be implemented by one or more processing circuits. Processing circuitry includes a programmed processor, as a processor includes circuitry. A processing circuit also includes devices such as an application specific integrated circuit (ASIC), DSP (digital signal processor), FPGA (field programmable gate array) and conventional circuit components arranged to perform the recited functions.

[0152]

The apparatuses, devices, and the like described are merely an illustration of one of several computing environments for implementing the embodiments disclosed herein. In one embodiment, the service providing system includes a plurality of computing devices such as server clusters. The plurality of computing devices is configured to communicate with one

another through any type of communication link, including a network, shared memory, etc., and perform the processes disclosed herein.

[0153]

The above-described embodiments are illustrative and do not limit the present invention. Thus, numerous additional modifications and variations are possible in light of the above teachings. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of the present invention. Any one of the above-described operations may be performed in various other ways, for example, in an order different from the one described above.

[0154]

The present invention can be implemented in any convenient form, for example using dedicated hardware, or a mixture of dedicated hardware and software. The present invention may be implemented as computer software implemented by one or more networked processing apparatuses. The processing apparatuses include any suitably programmed apparatuses such as a general purpose computer, a personal digital assistant, a Wireless Application Protocol (WAP) or third-generation (3G)-compliant mobile telephone, and so on. Since the present invention can be implemented as software, each and every aspect of the present invention thus encompasses computer software implementable on a programmable device. The computer software can be provided to the programmable device using any conventional carrier medium (carrier means). The carrier medium includes a transient carrier medium such as an electrical, optical, microwave, acoustic or radio frequency signal carrying the computer code. An example of such a transient medium is a Transmission Control Protocol/Internet Protocol (TCP/IP) signal carrying computer code over an IP network, such as the Internet. The carrier medium also includes a storage medium for storing processor readable code such as a floppy disk, a hard disk, a compact disc read-only memory (CD-ROM), a magnetic tape device, or a solid state memory device.

[0155]

This patent application is based on and claims priority to Japanese Patent Application Nos. 2021-048599, filed on March 23, 2021, and 2022-026625, filed on February 24, 2022, in the Japan Patent Office, the entire disclosure of which is hereby incorporated by reference herein.

[Reference Signs List]

[0156]

- 1 Information processing system
- 10 Information processing device
- 11 First communication unit
- 12 Information management unit
- 13 Meal supply amount estimation unit
- 14 Health level determination unit
- 15 Meal menu item suggestion unit
- 16 Database

20 Providing unit

300 Terminal device

[CLAIMS]**[Claim 1]**

An information processing device communicably connected to equipment of a facility that includes a cafeteria, comprising:

a meal supply amount estimation unit configured to estimate, based on information on attendance figures and information on a plurality of meal menu items served to a plurality of users in a past, a meal supply amount for each of the plurality of meal menu items, with respect to at least estimated attendance figures obtained based on the information on the attendance figures, the information on the attendance figures being obtained from the equipment, and the information on the plurality of meal menu items served to the plurality of users in the past being obtained from one or more pieces of the equipment in the cafeteria; and

a providing unit configured to provide information on the meal supply amount estimated by the meal supply amount estimation unit.

[Claim 2]

The information processing device of claim 1, wherein
the meal supply amount estimation unit estimates the meal supply amount for each of the plurality of meal menu items according to at least one of a day of a week or weather.

[Claim 3]

The information processing device of any one of claim 1 and claim 2, wherein
the meal supply amount estimation unit obtains a meal supply amount ratio for each of the plurality of meal menu items with respect to reference attendance figures, and multiplies the at least estimated attendance figures by the meal supply amount ratio to estimate the meal supply amount for each of the plurality of meal menu items, the reference attendance figures being obtained based on the information on the attendance figures.

[Claim 4]

The information processing device of any one of claim 1 and claim 2, wherein
the meal supply amount estimation unit acquires identification information identifying each of the plurality of users from the equipment, and obtains, based on the information on the plurality of meal menu items served to the plurality of users in the past, a probability that each of the plurality of meal menu items is served to each of the plurality of users, and adds up the probability for each of the plurality of meal menu items to estimate the meal supply amount for each of the plurality of meal menu items.

[Claim 5]

The information processing device of any one of claim 1 to claim 4, further comprising a meal menu item suggestion unit configured to:

compare the meal supply amount for each of the plurality of meal menu items with an available supply amount for a corresponding one of the plurality of meal menu items to determine a first menu item of which a supply amount is to be insufficient; and

suggest a second menu item to one of the plurality of users, the first menu item and the second menu item being included in the plurality of meal menu items and different from each other.

[Claim 6]

The information processing device of claim 5, further comprising
a health level determination unit configured to determine a health level of each of the plurality of users based on records of nutrient intake of a corresponding one of the plurality of users acquired from the one or more pieces of the equipment in the cafeteria,

wherein the second menu item is healthier than the first menu item, and the health level of the one of the plurality of users is determined to indicate unhealthy.

[Claim 7]

The information processing device of any one of claim 1 to claim 6, wherein
the equipment performs access control with respect to the facility with an integrated circuit (IC) card carried by each of the plurality of users.

[Claim 8]

An information processing method performed by an information processing device communicably connected to equipment of a facility including a cafeteria, comprising:

estimating, based on information on attendance figures and information on a plurality of meal menu items served to users in a past, a meal supply amount for each of the plurality of meal menu items, with respect to at least estimated attendance figures estimated based on the information on the attendance figures, the information on the attendance figures being obtained from the equipment, and the information on the plurality of meal menu items served to the users in the past being obtained from one or more pieces of the equipment in the cafeteria; and

providing information on the meal supply amount estimated.

[Claim 9]

A recording medium storing computer-readable code for controlling a computer system to carry out the method of claim 8.

[Claim 10]

A system including one or more computers connected, via a network, to equipment of a facility that includes a cafeteria, the one or more computers comprising:

a meal supply amount estimation unit configured to estimate, based on information on attendance figures and information on a plurality of meal menu items served to a plurality of users in a past, a meal supply amount for each of the plurality of meal menu items, with respect to at least estimated attendance figures obtained based on the information on the attendance figures, the information on the attendance figures being obtained from the equipment via the network, and the information on the plurality of meal menu items served to the plurality of users in the past being obtained from one or more pieces of the equipment in the cafeteria via the network; and

a providing unit configured to provide information on the meal supply amount estimated by the meal supply amount estimation unit.

FIG. 1

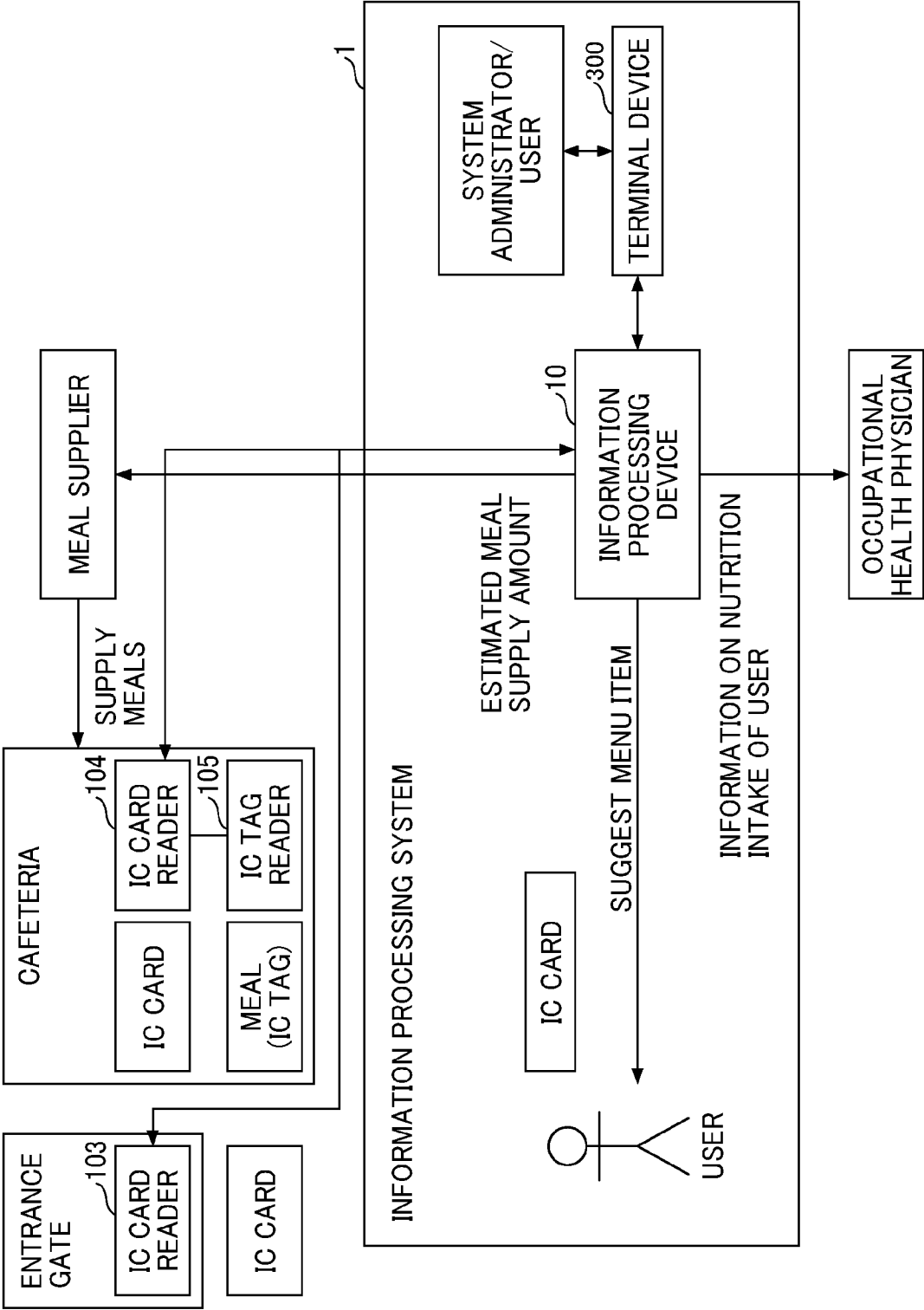


FIG. 2

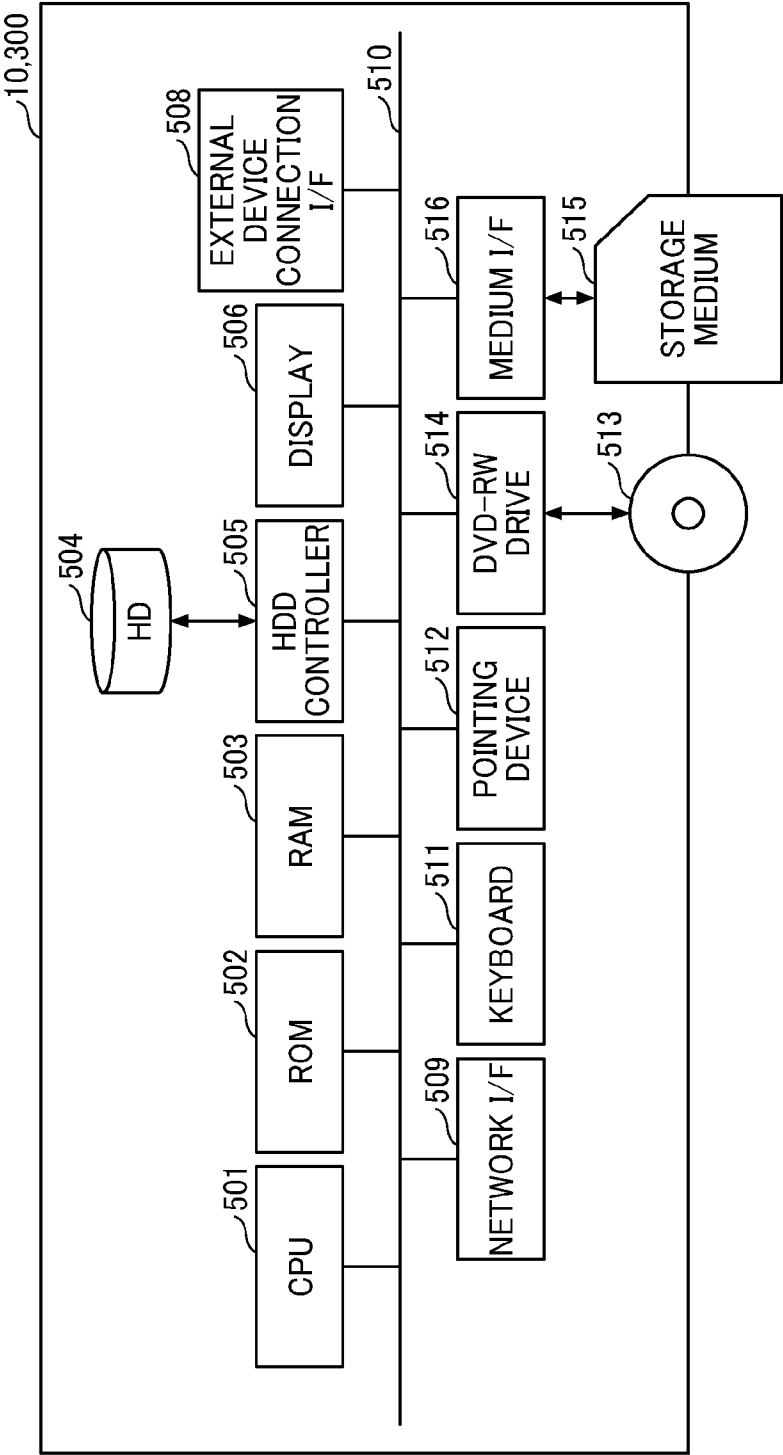


FIG. 3

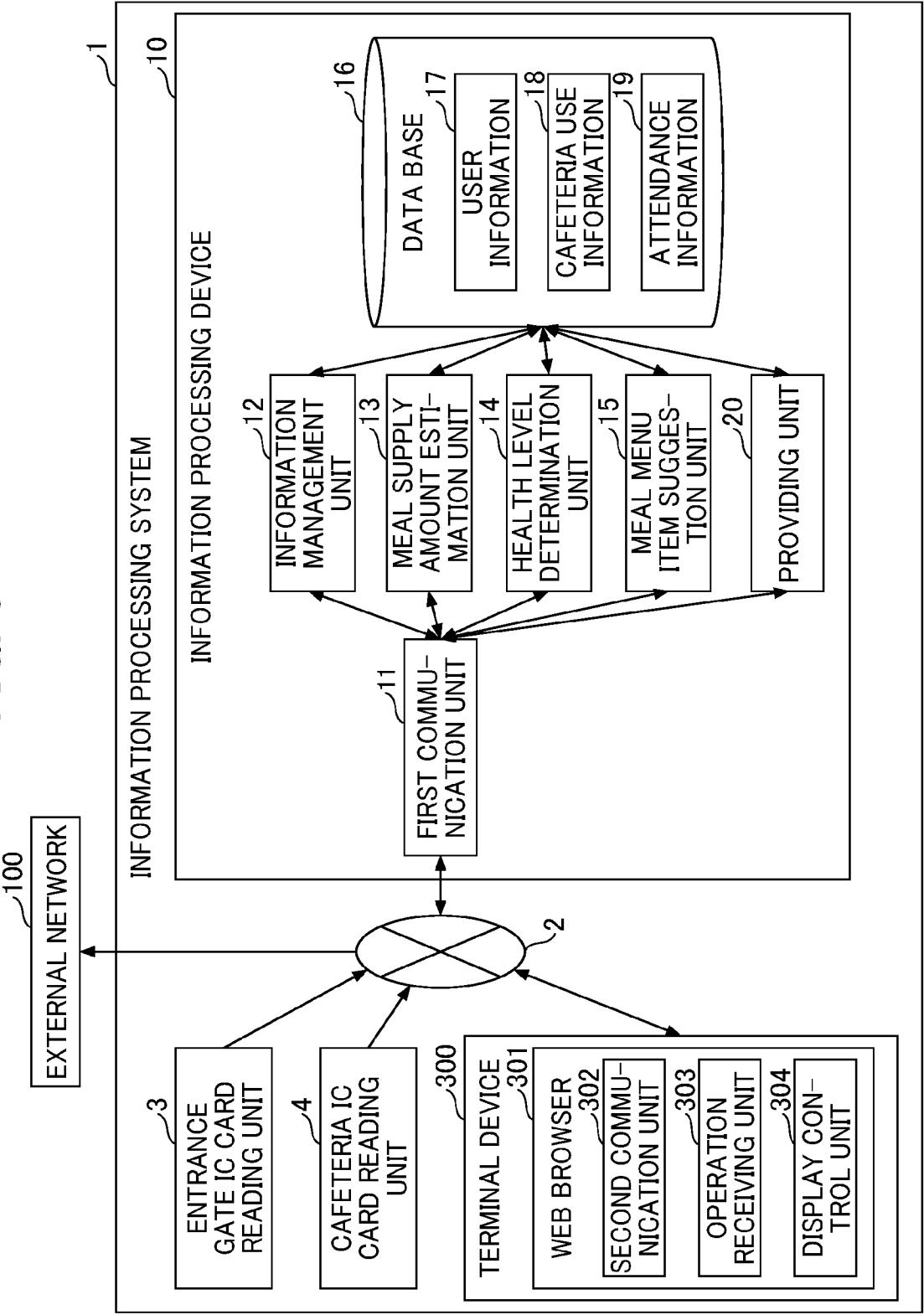


FIG. 4A

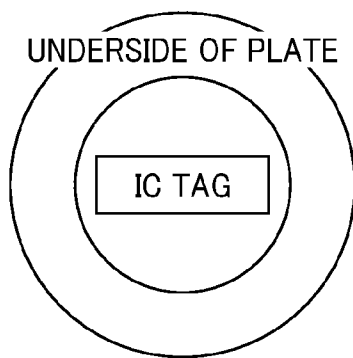


FIG. 4B

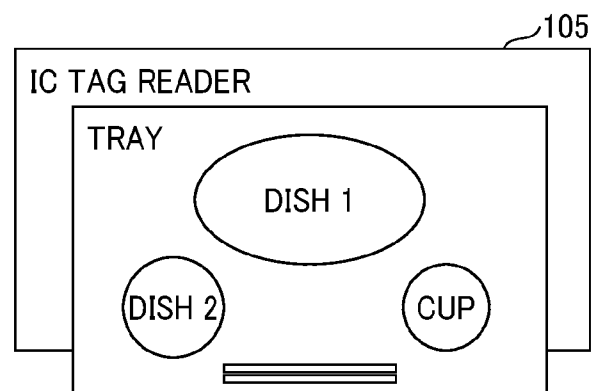
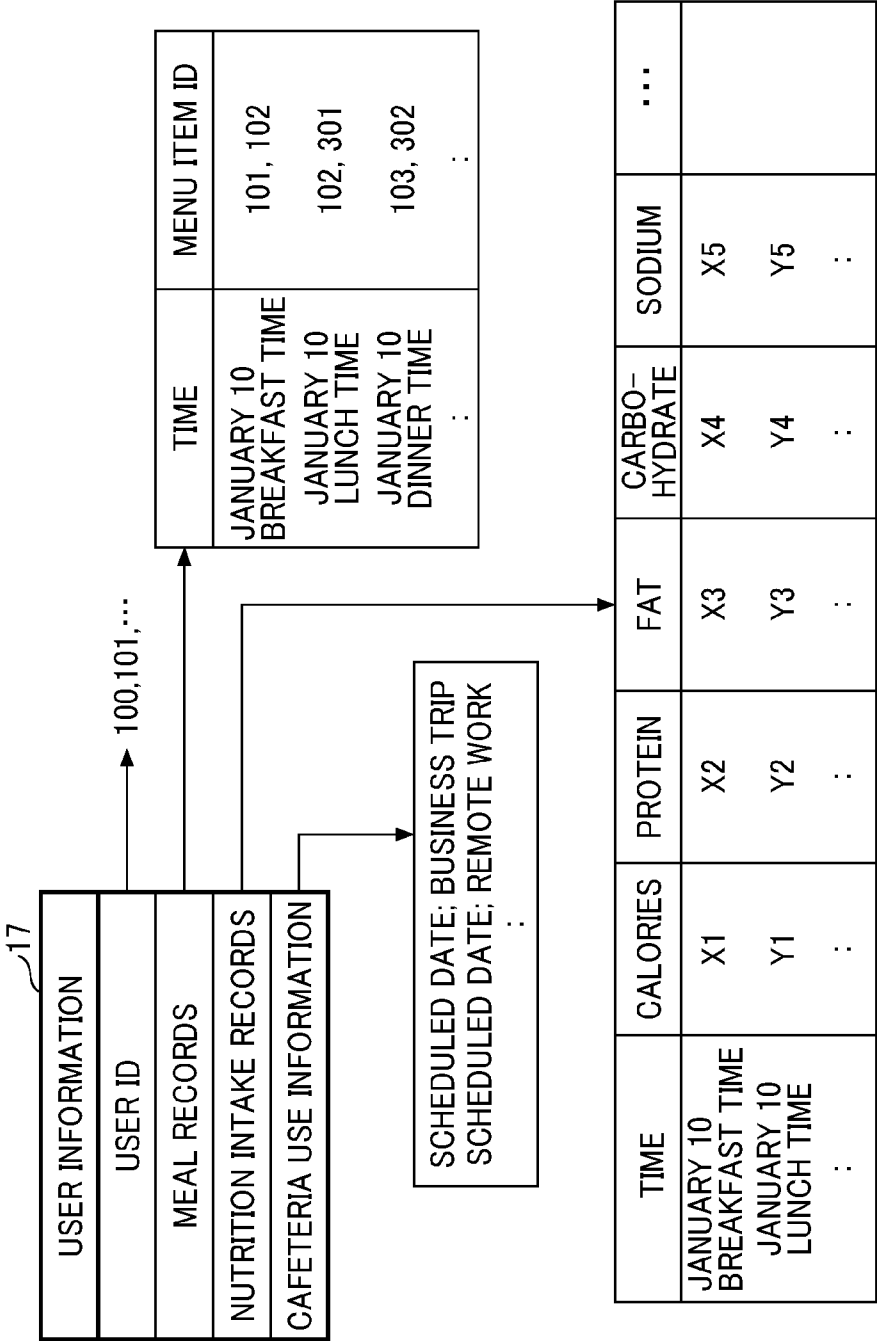


FIG. 5



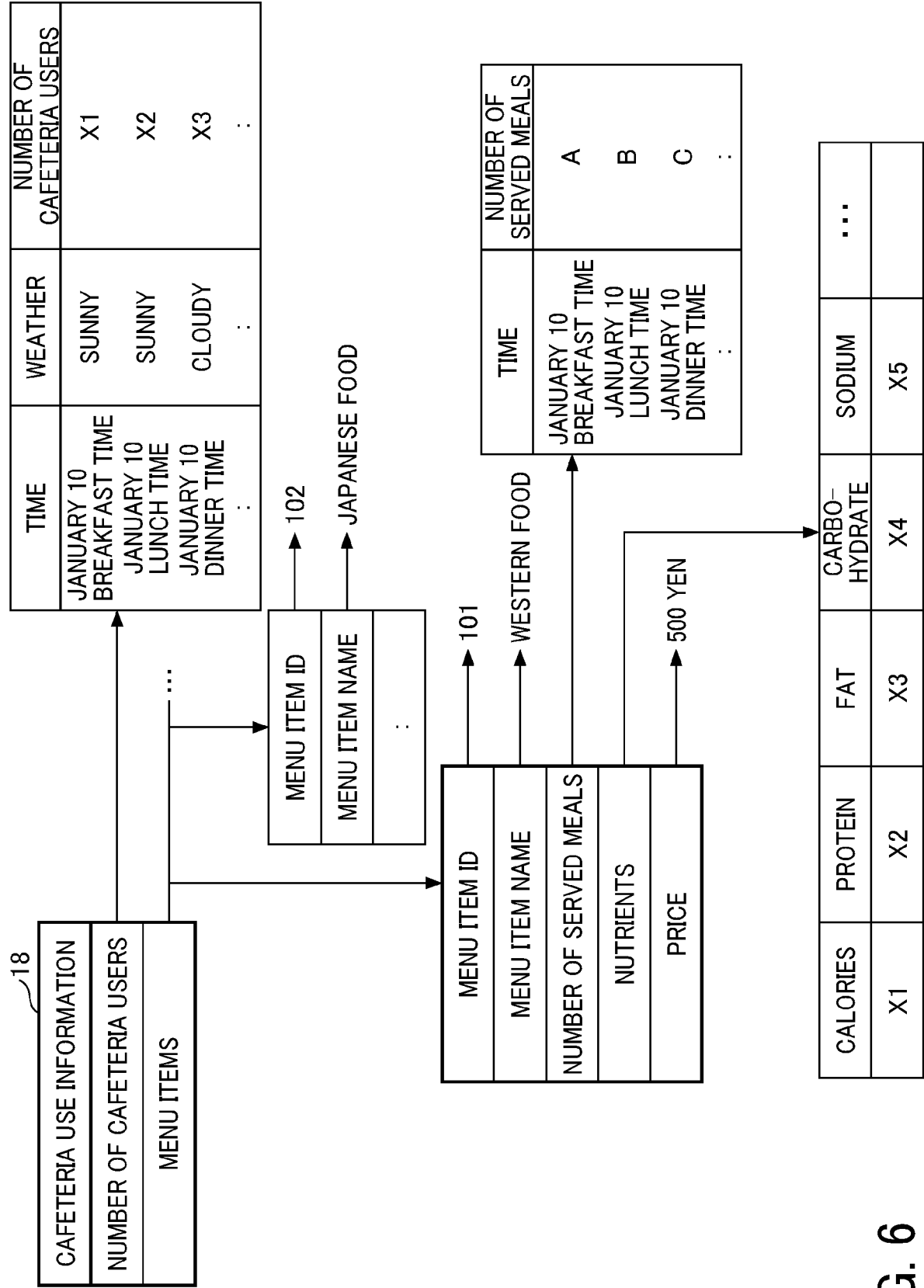


FIG. 6

FIG. 7

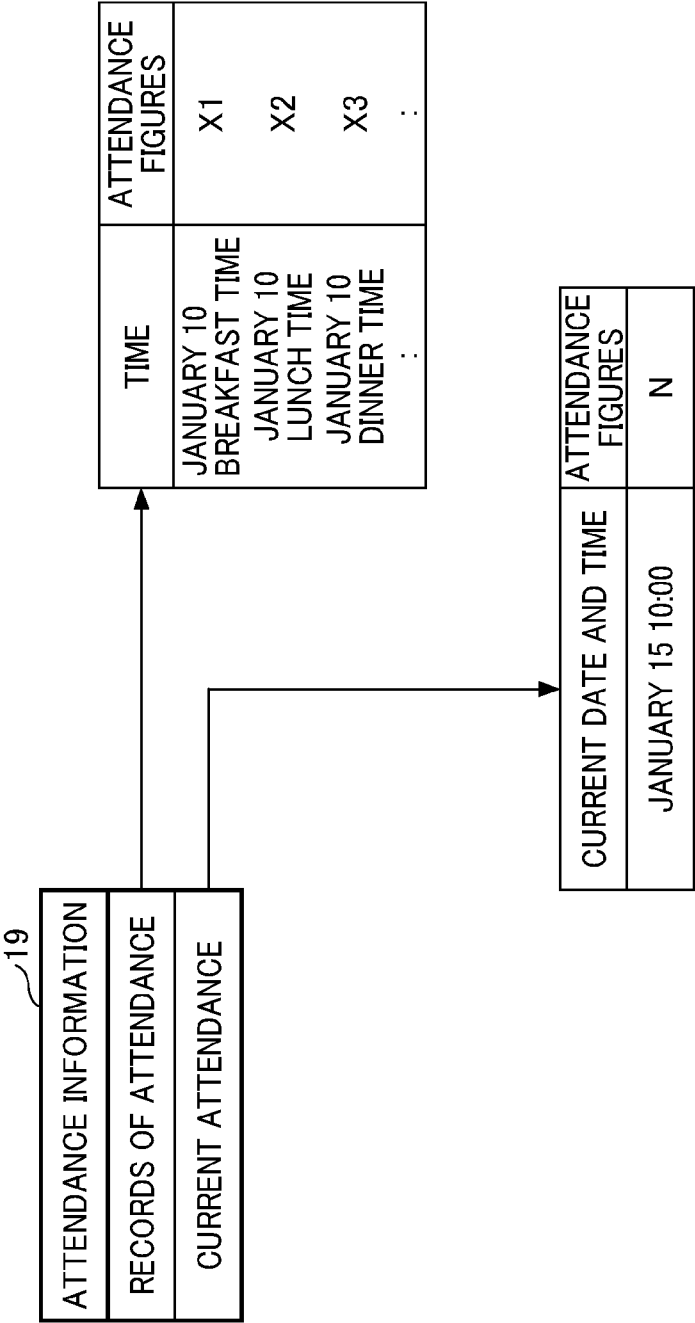


FIG. 8

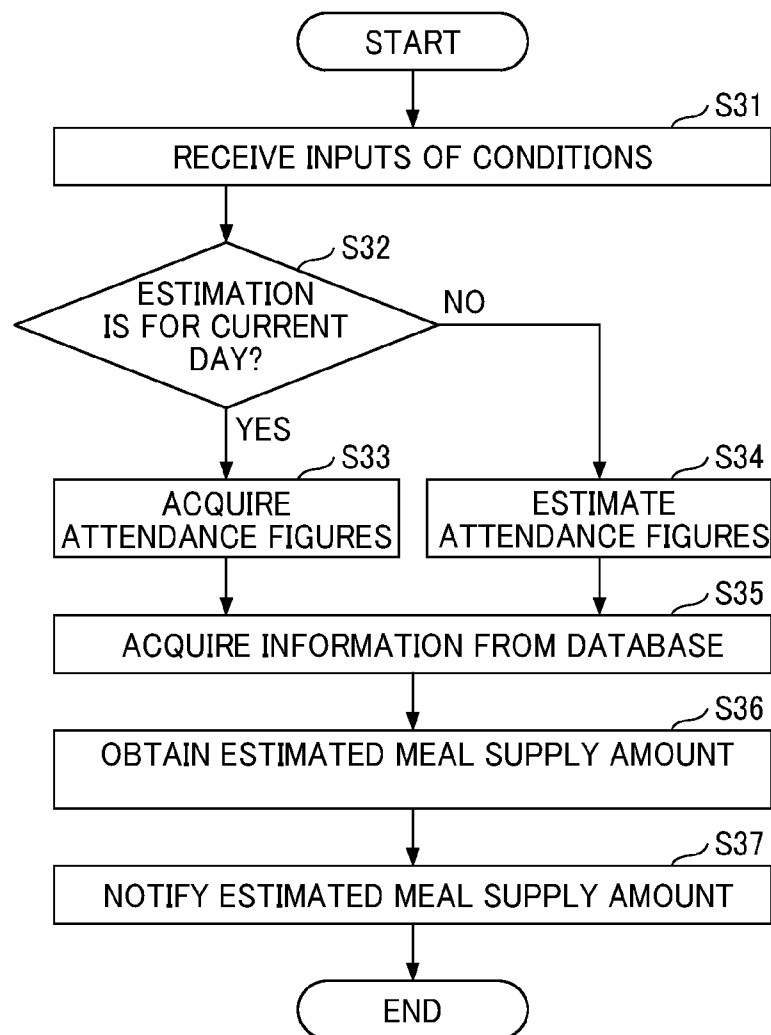


FIG. 9

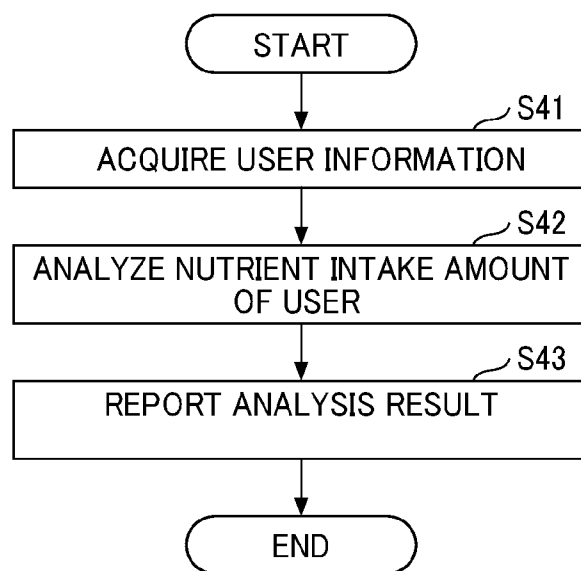


FIG. 10

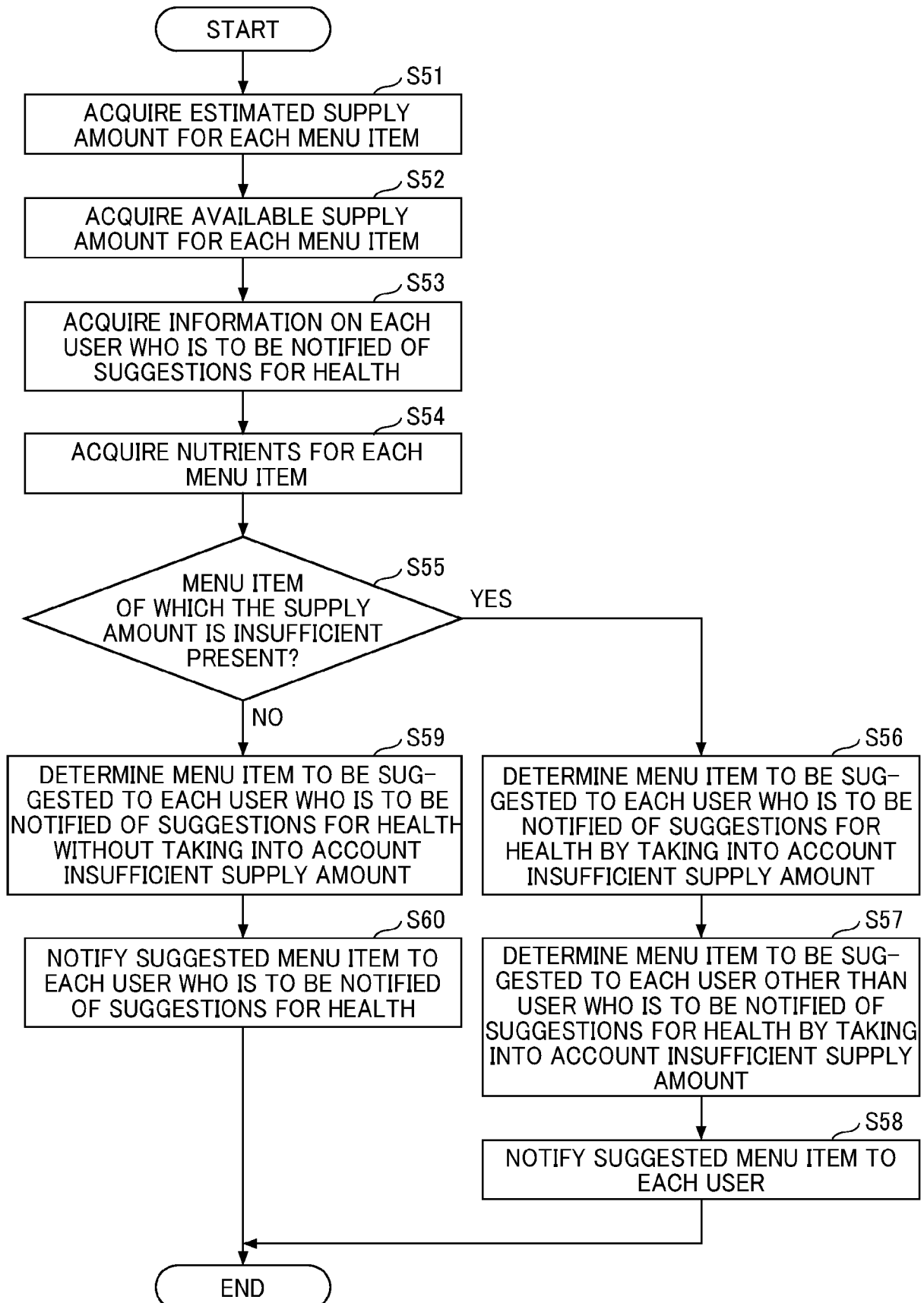


FIG. 11

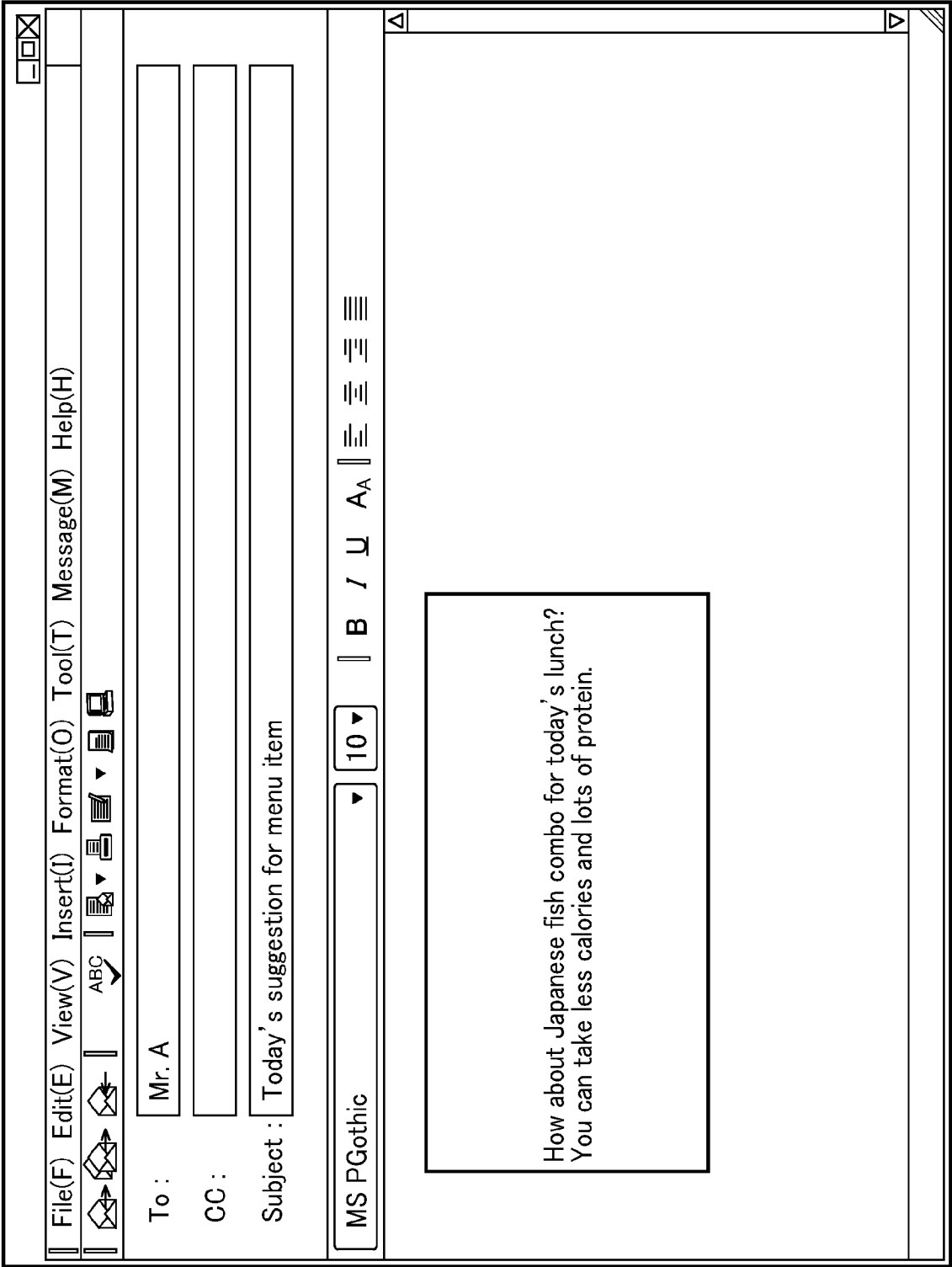


FIG. 12

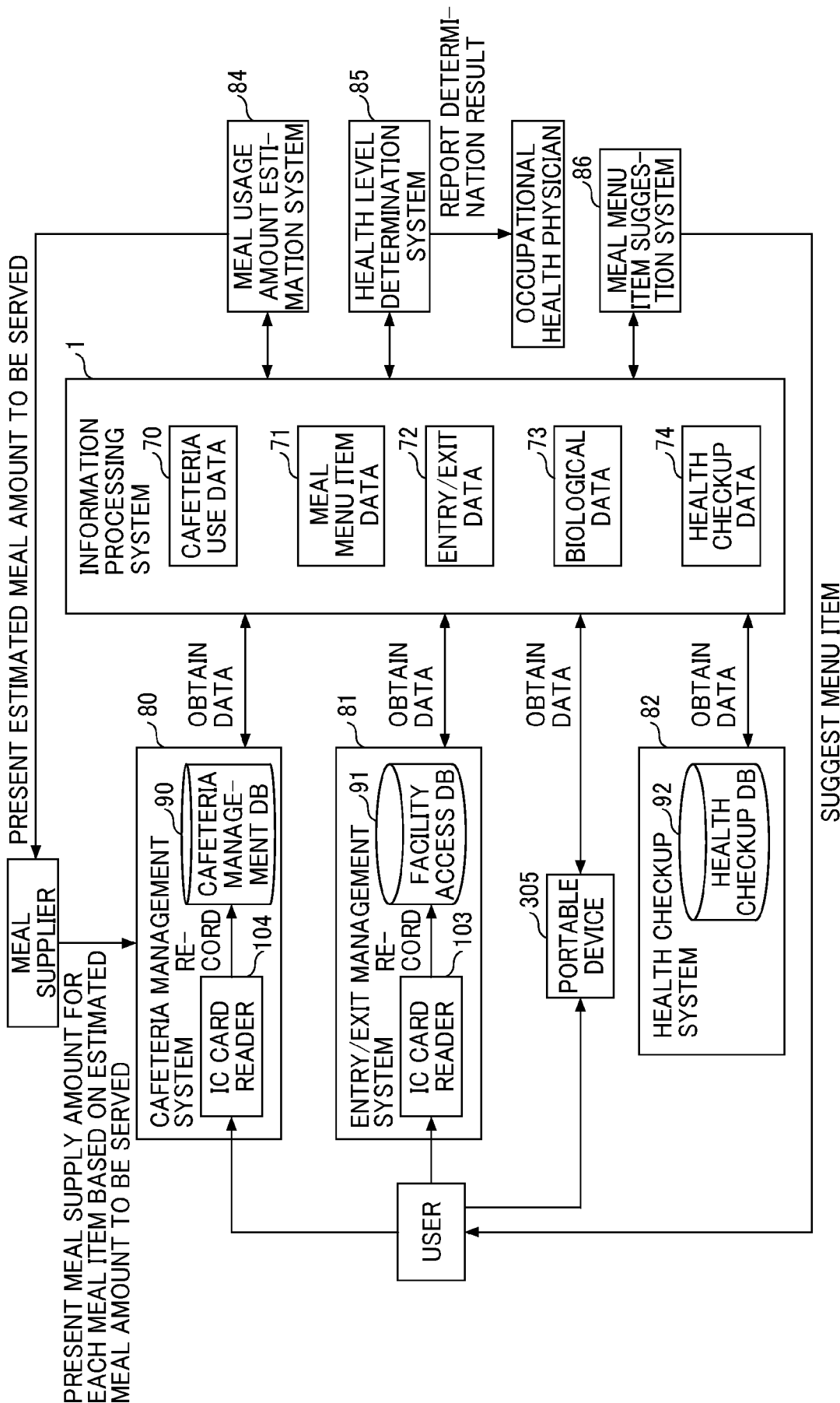


FIG. 13

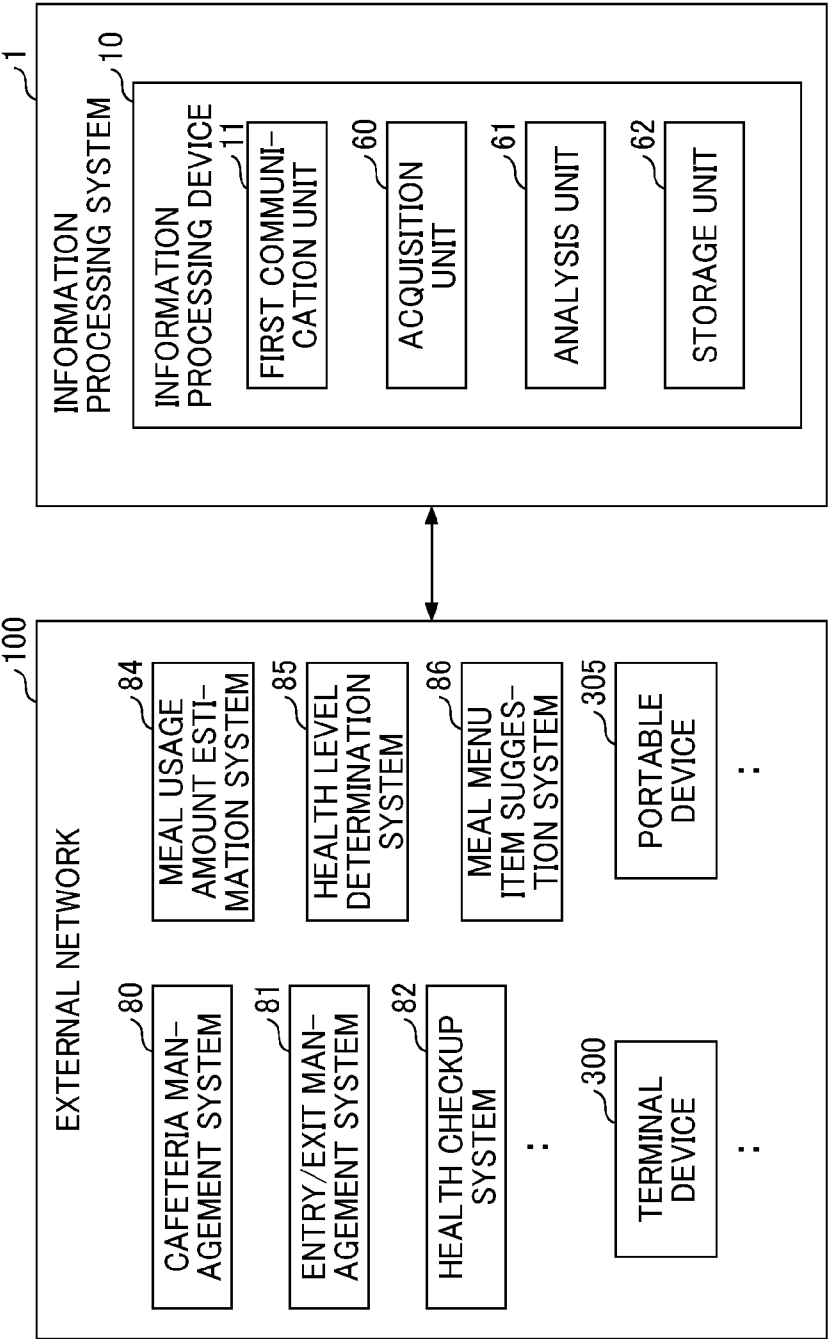


FIG. 14A

FIG. 14

FIG. 14A

FIG. 14B

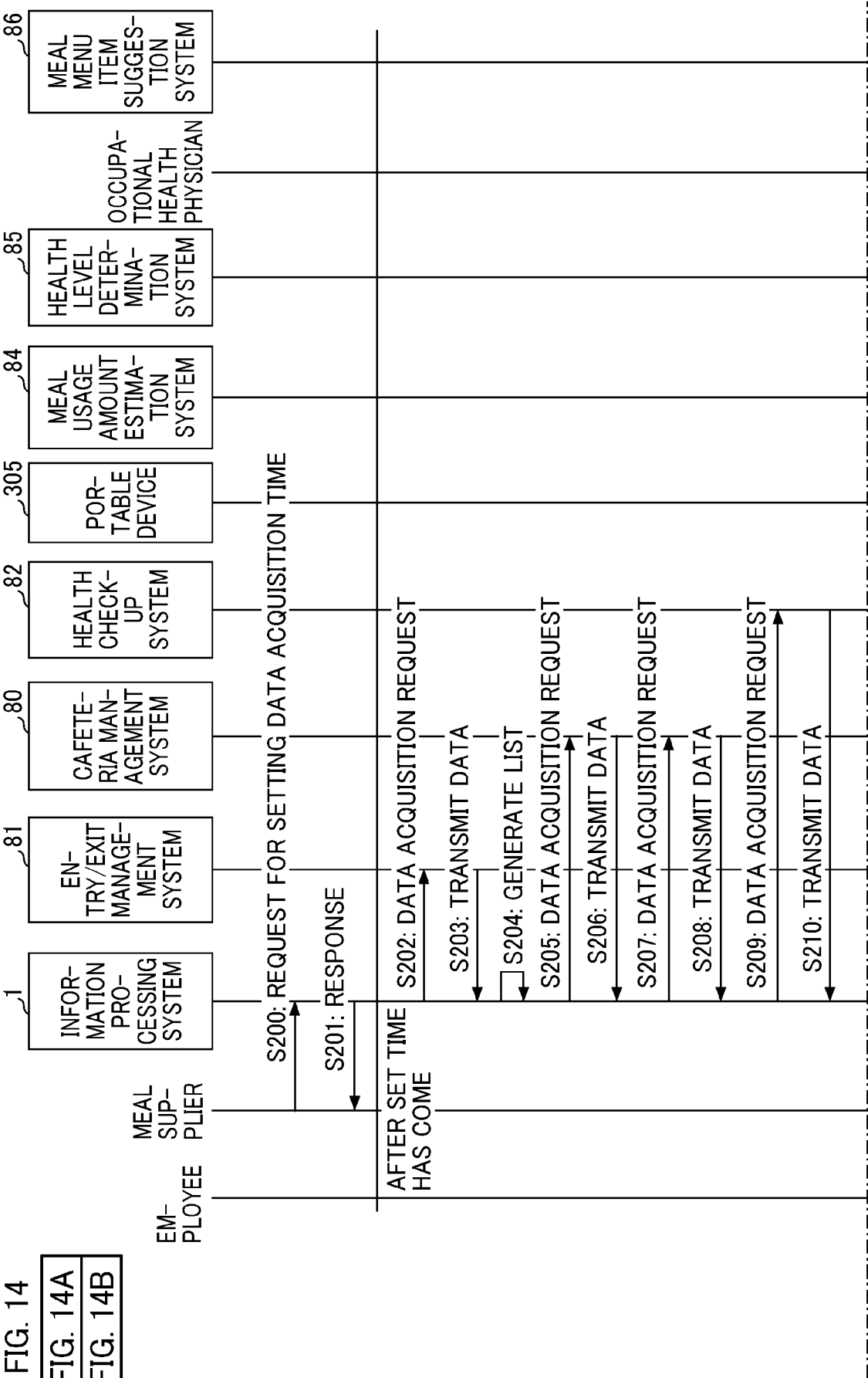


FIG. 14B

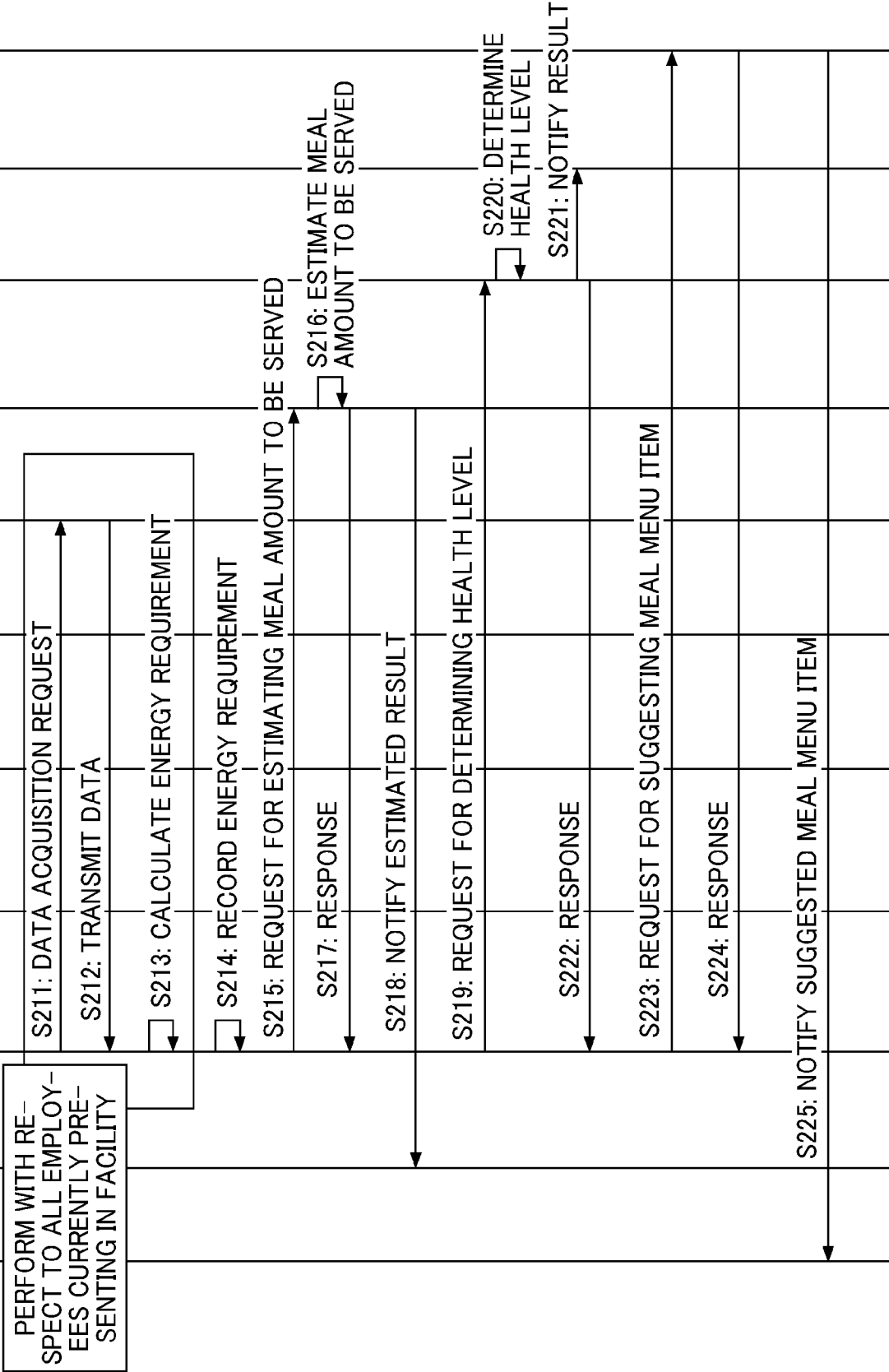


FIG. 15

72

COMPANY ID	EMPLOYEE ID	ENTRY TIME AND DATE	EXIT TIME AND DATE
K001	012345	2021/12/03 08:45	2021/12/03 18:45
K002	023456	2021/12/03 08:10	2021/12/03 19:10
K003	034567	2021/12/03 08:12	2021/12/03 20:12
:	:	:	:

FIG. 16

70

EMPLOYEE ID	USE TIME AND DATE	MENU ITEM ID(S)
012345	2021/12/03 11:45	101, 201
023456	2021/12/03 12:10	103, 201, 303
034567	2021/12/03 12:12	102, 203, 301
:	:	:

FIG. 17

71

MENU ITEM ID	NUMBER OF SALES	PRICE	CALORIES	NUTRITION FACTS (AMOUNT PER 100G)			
				PROTEIN	FAT	CARBOHY-DRATE	SODIUM
101	28	100	X1	X2	X3	X4	X5
102	35	180	Y1	Y2	Y3	Y4	Y5
103	62	250	Z1	Z2	Z3	Z4	Z5
:	:	:	:	:	:	:	:

FIG. 18

74

EMPLOYEE ID	AGE	HEIGHT	WEIGHT	BLOOD GLU- COSE LEVEL
012345	32	180	82	95
023456	21	162	51	88
034567	42	155	44	113
:	:	:	:	:

FIG. 19

73

EMPLOYEE ID	RECEPTION DATA AND TIME	NUMBER OF STEPS	ENERGY REQUIREMENT
012345	2021/12/03 12:03	3215	X
023456	2021/12/03 12:04	2195	Y
034567	2021/12/03 12:05	7201	Z
:	:	:	:

FIG. 20

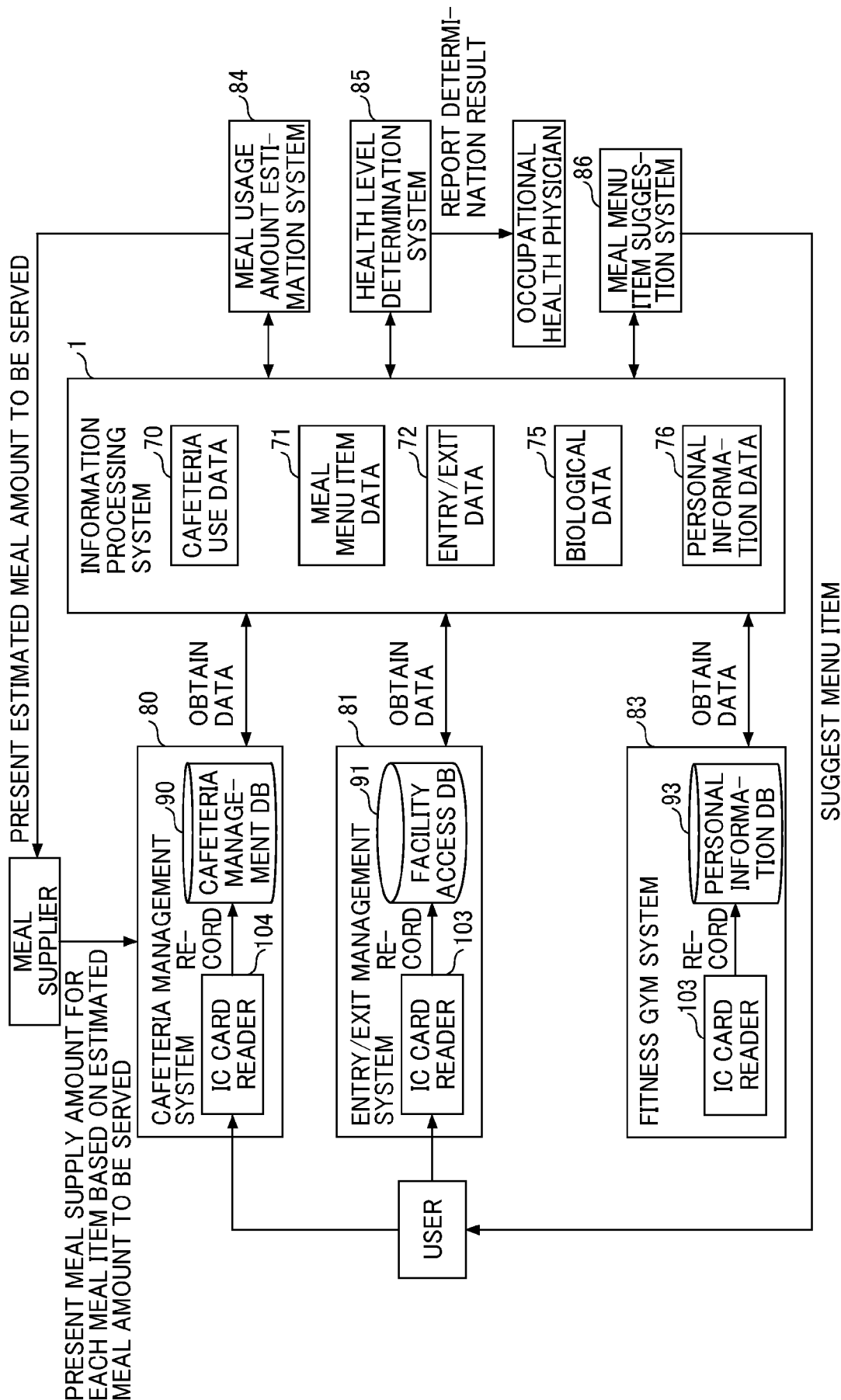
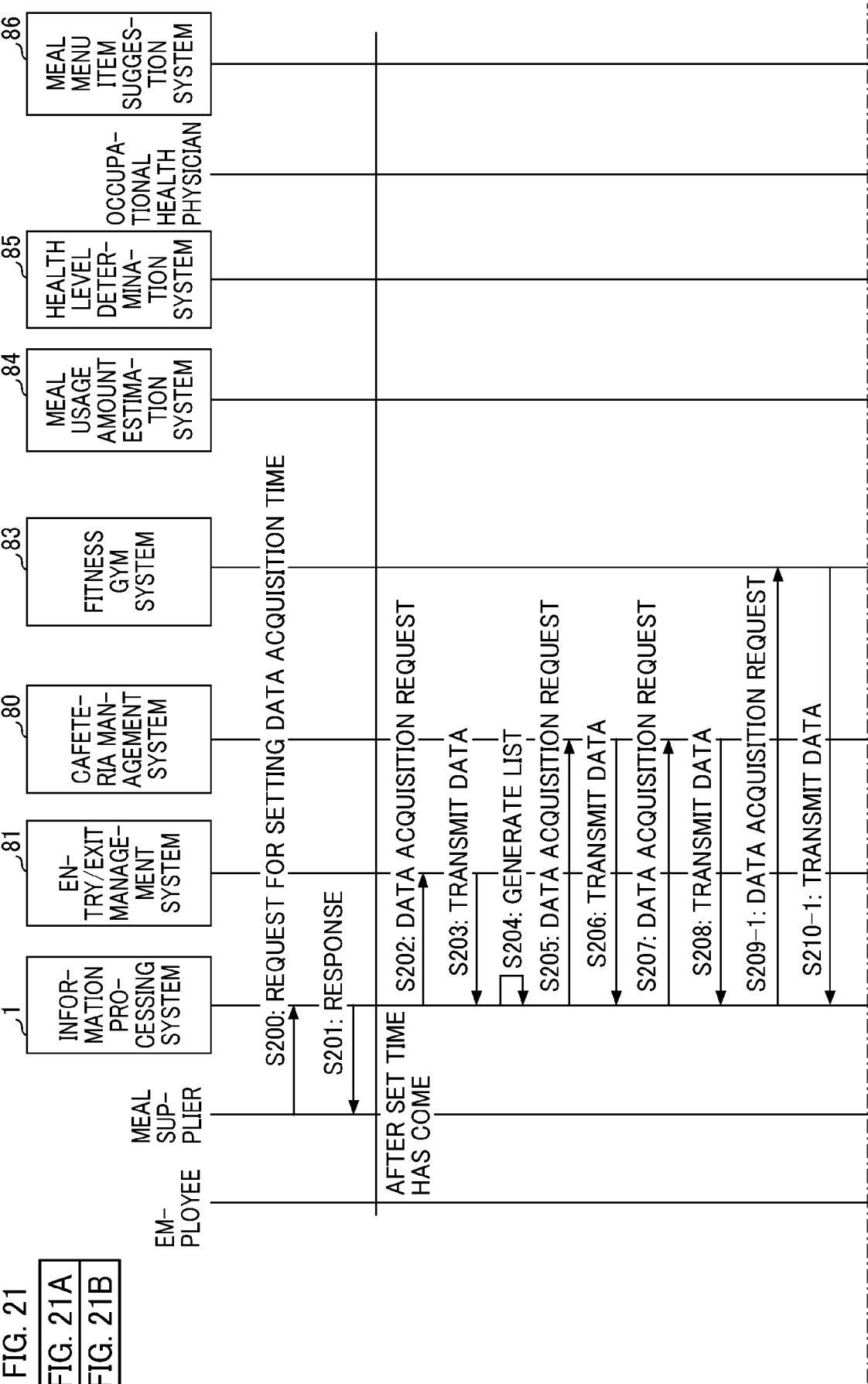


FIG. 21A

FIG. 21

FIG. 21A
FIG. 21B



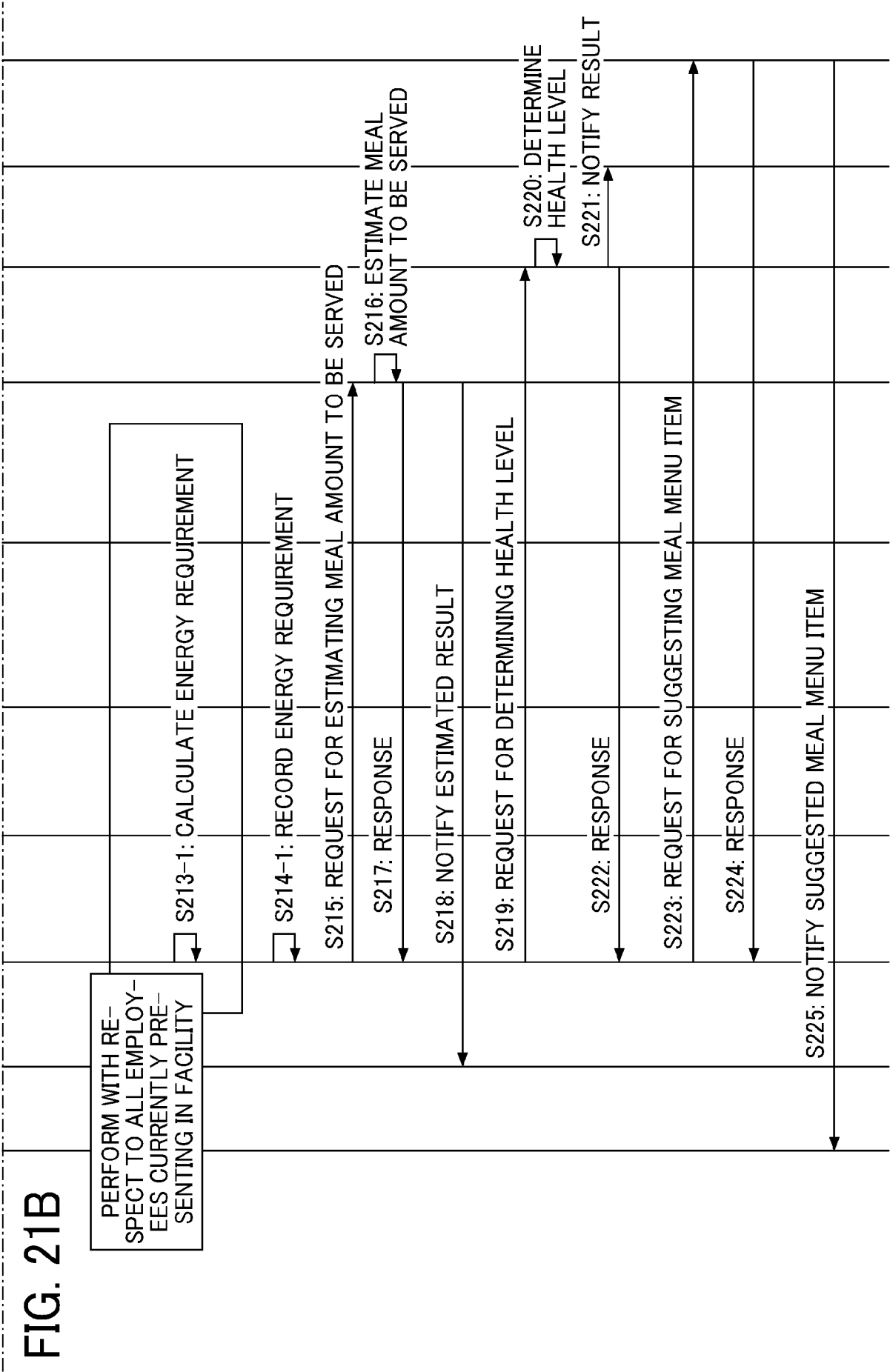


FIG. 22

75

EMPLOYEE ID	MEASUREMENT DATE	AGE	HEIGHT	WEIGHT	BODY FAT PERCENTAGE	MUSCLE MASS	ENERGY REQUIREMENT
012345	2021/10/15	32	180	82	17	X	X
023456	2021/11/18	21	162	51	15	Y	Y
034567	2021/12/05	42	155	44	23	Z	Z
:	:	:	:	:	:	:	:

FIG. 23

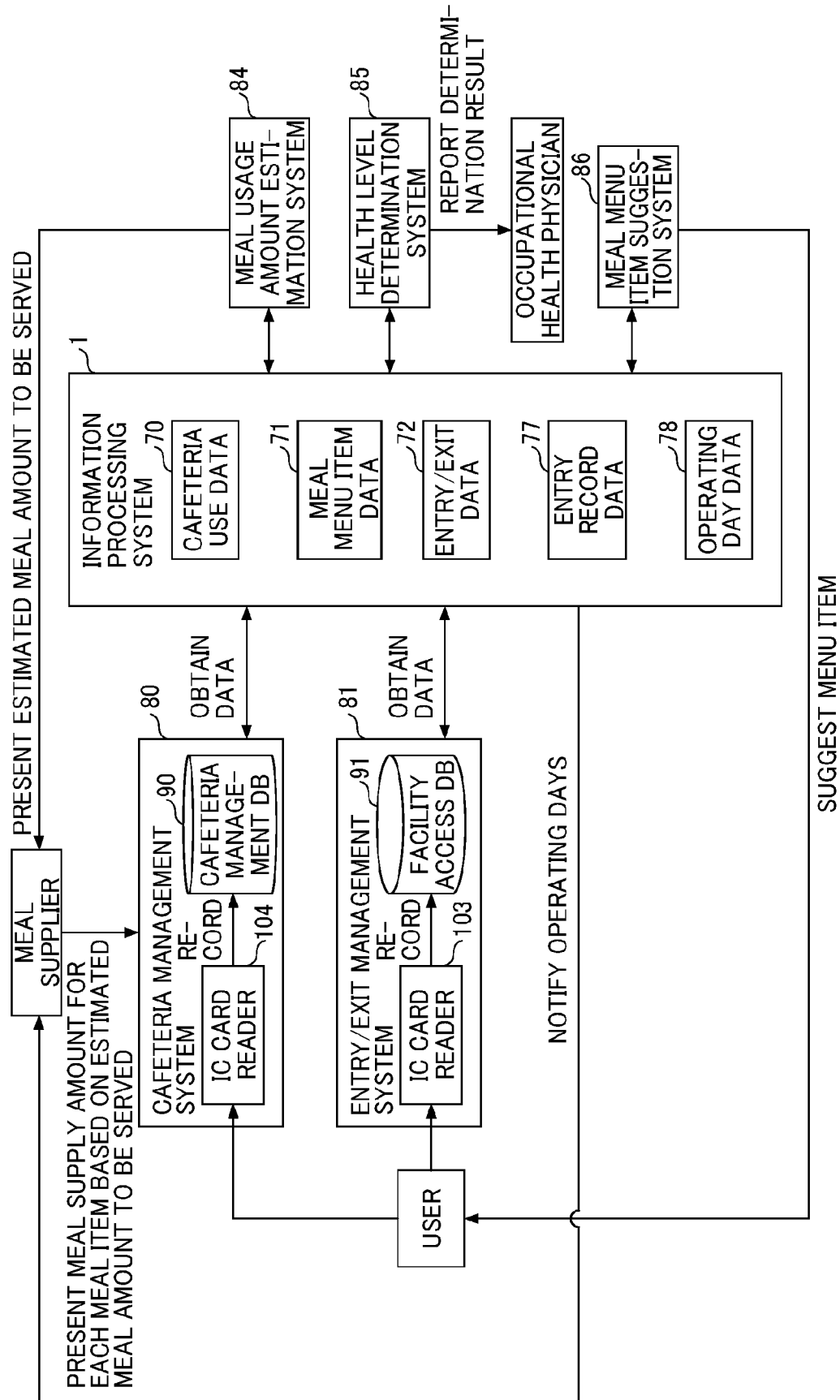
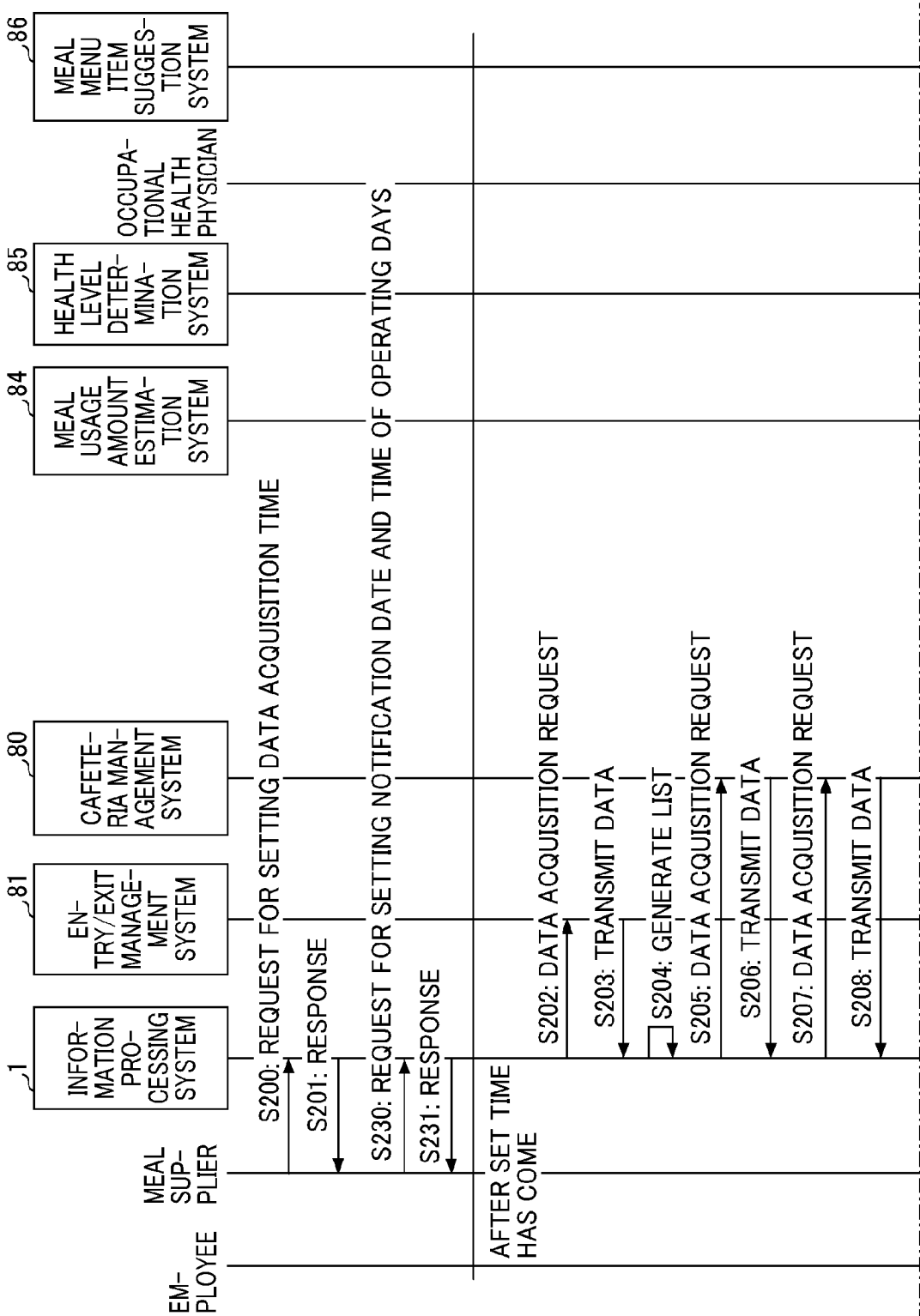


FIG. 24A

FIG. 24

FIG. 24A
FIG. 24B



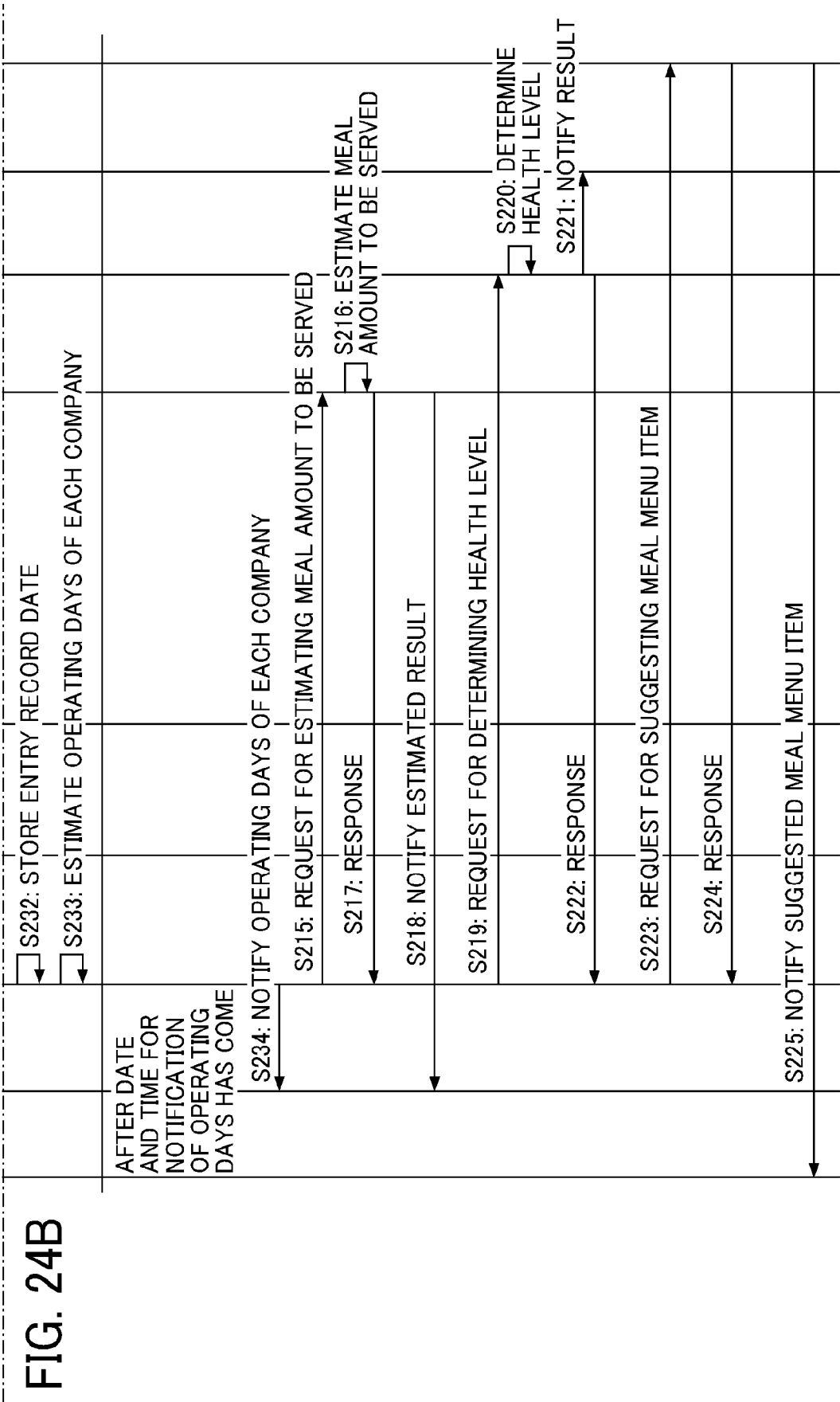


FIG. 25

77

COMPANY ID	EMPLOYEE ID	ENTRY TIME AND DATE
K001	000001	2021/12/03 08:45
K001	000002	2021/12/03 08:10
K001	000003	2021/12/03 08:12
:	:	:

FIG. 26

78

COMPANY ID	OPERATING DAYS
K001	12/1, 2, 3, 5, 6, 7, 8, 9, 10, 11, ...
K002	12/1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ...
K003	12/2, 3, 4, 6, 7, 9, 10, 11, 13, ...
:	:

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2022/051864

A. CLASSIFICATION OF SUBJECT MATTER INV. G06Q10/06 G06Q30/06 G06Q50/12 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) G06Q		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2018 205877 A (TOSHIBA CORP; TOSHIBA INFRASTRUCTURE SYSTEMS & SOLUTIONS CORP) 27 December 2018 (2018-12-27) cited in the application the whole document -----	1-10
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
25 May 2022	03/06/2022	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lutz, Andreas	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2022/051864

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2018205877 A	27-12-2018	JP 6896509 B2	30-06-2021
		JP 2018205877 A	27-12-2018
