A game in which a player is scored on their ability to perform mathematical operations on a number, changing the value of the number so that it is divisible by another number. Players can be tested on their ability to perform accurate calculations, and quick calculations. Additionally, the game will test strategic thinking of players as they attempt to earn the best possible score or time.
Start Game

User Chooses Base Number z=2

Create Current Number x

Start Game

Is x Divisible by z?

Yes

Divide x by z n times to Determine New Number

No

End Game

Score = 0

Score = n

Score = n

x = New Number

x = 1?

No

Display x and offer addition/subtraction options:

y = 1, 2, or 4

Yes

Add or subtract chosen number (1, 2, or 4) from x

Divide x by 2 n times to Determine New Number

x = New Number

No

Does n=0?

Yes

Score = Score-3

Score = Score-2

Score = Score-1

Score = Score

Yes

Score = Score-2

No

Score = Score-1

Score = Score

FIG. 1
FIG. 2

Base 2

Score: 0

Current Number: 27

-1  +1  

-2  +2

-4  +4
Start

Select Current Number x

Select Addition Amount y₁

Select Subtraction Amount y₂

Select Base Number z

Start Timer

Display x, y₁, y₂, z

Is User Finished?

Yes

Is x divisible by z?

Yes

Stop Timer

Display Time

End

No

Add y₁ to x

Add y₂

User Input

No

Subtract y₂ from x

Subtract y₂

FIG. 3
Yes - is \( n \) a prime number?

- Select \( x \)
- Select \( y \)
- Display \( x \) and \( y \)
- Determine Maximum Rounds Allowed
  - \( \text{Round} = 0 \)

- \( x = x^* y \)
- Is \( x \) divisible by \( y \)?
  - Yes → Is \( \text{Round} < \text{Maximum Rounds Allowed} \)?
    - Yes → User Wins
    - No → No
  - No → No
- Is \( y \) a prime number?
  - Yes → User enters amount \( y \)
  - No → User Loses
- \( \text{Round} = \text{Round} + 1 \)
- End

**FIG. 5**
FIG. 6

Base: 2520
Rounds: 0
Max Rounds: 3
Current Number: 80
Enter Number: 0

Key:
1 2 3
4 5 6
7 8 9
Enter 0
Create Number → Game A

Start Game → Game B

Send Number to Game B

Wait for Confirmation

Display Number

Start Timer

Play Game

Record Score, Number of Operations, Time

Which player posted a better score?

Player A wins → Player B

Player B wins → Player A

Which player performed fewer operations?

Player A wins → Player A

Player B wins → Player B

Which player had a better time?

Player A wins → Player A

Player B wins → Player B

Game is a tie

End Game

FIG. 7
VIDEO GAME BASED ON DIVISIBILITY OF NUMBERS

[0001] The invention is a math-based puzzle game played on the computer. This game uses a game scoring system that measures the player's facility with mathematical operations as they use those operations to change the value of a number so that it is then divisible by another number.

BACKGROUND

[0002] For people who enjoy the mental exercise of manipulating numbers, there are few truly mathematical games available to them. Numerical games often take the form of elimination games or spatial relation games in which numbers could be just as easily replaced by letters or objects.

[0003] Likewise, there are story problems that test the individual's ability to apply mathematics or algebra to examples that are supposed to come from the real world. However, these do not score the player's facility with numbers themselves. The final answer is either right or wrong, regardless of the steps required to get there. Furthermore, the story problems are rarely as much about the numbers themselves as they are about one's ability to put them into the correct formula. Thus, the actual numbers in the calculation become afterthoughts.

[0004] Additionally, there are games that test the user's ability to perform given mathematical operations. However, these games will report only whether the user correctly performed the given operation. These are more collections of math problems than an actual game.

[0005] A video game that tests a player's ability to perform mathematical operations in a strategic manner would allow players to enjoy the act of mental calculation without being recreations of math homework. A player manipulating numbers in a video game that tests their mathematical and strategic skills would allow them to enjoy the calculations as movement toward some goal. The numbers become active components of the video game, rather than simple calculation objects, arbitrary symbols, or tedious busywork concluding a process that is essentially already complete.

BRIEF SUMMARY

[0006] The invention is a video game in which a player is scored on their ability to perform mathematical operations on a number x, such that the new value of x is divisible by a number z. This includes, but is not limited to, mathematical functions such as addition, subtraction, multiplication, and division. The player of this video game performs mental arithmetic and performs certain mathematical operations that reflect the player's arithmetic. When playing the video game, the player must make decisions based on earning the best-possible score, or finishing with the best-possible time. The video game then rates the player's facility with these calculations through a game scoring system that can reward strategy, speed, and arithmetic skill.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a flowchart describing a game in which a number (x) must be altered by possible values (y) so that x is divisible by a base number (z). The player gains points for any new value of x that is divisible by 8 (z'), but loses points for any value that is divisible only by 4, 2, or 1 (z').

[0008] FIG. 2 is a sample interface that can be used for the game described by FIG. 1.

[0009] FIG. 3 shows a possible flow for a game in which the user begins with a number (x) that must be changed to a number that is divisible by another number (z). The player must add a value (y1) or subtract a value (y2) to the number to make it divisible by z. When the player thinks that x is divisible by z, the user reports it and the game determines whether the player has correctly created a number that is divisible by z. If the player is correct, the game ends. If the player is incorrect, the game continues. At the end of the game, the player's time is reported.

[0010] FIG. 4 shows a sample interface that can be used for the game described by FIG. 3.

[0011] FIG. 5 shows a possible flow for a game in which the user must multiply a number (x) by prime numbers (y) until the number x is divisible by another value (z). The game determines a maximum allowed number of times a prime number (y) can be multiplied into x. If the player uses too many prime numbers, the player loses the game. If the player uses a number of prime numbers less than or equal to the maximum allowed, the player wins.

[0012] FIG. 6 shows a sample interface that can be used for the game described in by FIG. 5.

[0013] FIG. 7 shows a possible flow for determining the winner of a game in which players are competing against each other for time and score by performing mathematical operations to change the values of numbers such that the new values are divisible by another number.

DETAILED DESCRIPTION

[0014] The following paragraphs describe a game in which a player is given or selects a Current Number (x) on which to perform mathematical operations. The player then uses other number values (y) to perform mathematical operations (e.g. addition, subtraction, multiplication, division) on x such that x is divisible by a Base Number (z).

[0015] FIG. 1 is a flowchart describing a game. In the game, the player begins with a number x. The player must add or subtract an amount y from the number x so that x+y or x-y is divisible by a number z, which is set to 2 in this example. If the new number (x+y or x-y) is divisible by or equal to 2 to the power of 3 or greater, the player earns points. If the new number is not divisible by 2, but is divisible by 2², 2¹, or 2², the player loses points. In this example, the player may play the game to maximize the points scored, or against a maximum possible score value, or against a defined score required to win the game, or against another player's score.

[0016] FIG. 2 provides a sample interface that demonstrates an example of the flow in FIG. 1. In FIG. 2, the initial value for the Current Number 203 is 11. The Base Number 201 is 2, and the Score 202 is set to 0 (zero). The player will use the buttons 204 to change the value of the Current Number 203.

[0017] The game starts by dividing the Current Number 203 by the Base Number 201 (2) as many times as possible. The Current Number 203 cannot be divided by the Base Number 201, leaving the Score 202 at 0.

[0018] The player presses the “+1” button 205, changing the value to 12. The game divides 12 by 2 twice. The game subtracts 1 from the value of Score 202 and divides the Current Number 203 by 2, which equals 3. The game adds the value of the Current Number 203 to 3. The Score 202 is now -1 and the Current Number 203 is 3.
Next, the player presses the "+1" button 205 again, changing the Current Number 203 to 4. The game divides 4 by 2 twice. The game subtracts 1 from Score 202 and divides the Current Number 203 by 2^2, which equals 1. The Score 202 is now -2 and the Current Number 203 is 1.

The game is over, with the player earning a final Score 202 of -2. However, a higher final Score 202 can be earned using the same rules in FIG. 1 and the example and interface in FIG. 2.

As before, the game starts by dividing the Current Number 203 by the Base Number 201 (2) as many times as possible. The Current Number 203 cannot be divided by the Base Number 201, leaving the Score 202 at 0.

The player presses the "+4" button 206, changing the value to 15. The game divides 15 by 2 zero times (2^0). The game subtracts 3 from the value of Score 202. The Current Number 203 is unchanged. The Score 202 is now -3 and the Current Number 203 is 15.

Next, the player presses the "+1" button 205, changing the Current Number 203 to 16. The game divides 4 by 2 four times. The game adds 4 to Score 202 and divides the Current Number 203 by 2^4, which equals 1. The Score 202 is now 1 and the Current Number 203 is 1.

The game is over, with the player earning a final Score 202 of 1.

FIG. 3 is a flowchart describing a game. The game also begins with a number x. The player adds a value y, or subtract a value z, from the number so that x + y, or x - z, is divisible by or equal to a number z. The game times the user to determine the total amount of time they used before finding a number divisible by or equal to z. The player may need to find a number before a maximum amount of time has expired, or the player may play the game to register their best time, or the player may play the game against another player’s time.

FIG. 4 provides a potential interface for the game described in FIG. 3, and an example of how the game is played. The initial value for the Current Number 403 is 164. The Base Number 401 is 37. The Time 402 begins at 0:00. The player will use the buttons 404 to change the value of the Current Number 403 so that it is divisible by the Base Number 401.

The timer starts and the player presses the "+17" button 406. The Current Number 403 is changed to 181.

The player presses the "Enter" button 407. The game checks if the number is divisible by 37. It is not, so the timer continues.

The player presses the "+17" button 406 again, changing the Current Number 403 to 198.

The player presses the "-13" button 405, changing the Current Number 403 to 185.

The player presses the "Enter" button 407. The game checks if the number is divisible by 37. It is, so the timer stops, showing the player their total time.

FIG. 5 is a flowchart describing a game. The game begins with a number x and a number z. The game determines a maximum number of operations that can be performed on x before the player should have a number divisible by z. The player must multiply the number x by values of y so that x is divisible by a number z. The game determines how many times the user multiplies the number x by a number y until finding a number divisible by or equal to z. The game then determines if the user performed a number of operations less than or equal to the maximum rounds allowed. If the user performed a number of operations less than or equal to the maximum, the user wins. If the user performed a number of operations greater than the maximum, the user loses the game.

FIG. 6 provides a potential interface for the game described in FIG. 5, and an example of how the game is played. The initial value for the Current Number 603 is 80. The Base Number 601 is 2520. The Rounds counter 602 is set to 0 (zero). The Maximum Number of Rounds 609 is set to 3. The player uses the Number Buttons 605 to enter a number that will be multiplied by the Current Number 603 when the player presses the "Enter" button 608.

The player begins by pressing the "3" button 606. The player then presses "Enter" button 608. The Current Number 603 is multiplied by 3 and is now 240. The Rounds counter 602 is incremented to 1.

The player presses the "3" button 606 again. The player then presses "Enter" button 608. The Current Number 603 is multiplied by 3 and is now 720. The Rounds counter 602 is incremented to 2.

The player presses the "7" button 607. The player then presses "Enter" button 608. The Current Number 603 is multiplied by 7 and is now 5040. The Rounds counter 602 is incremented to 3.

The Current Number 603 is divisible by the Base Number 601. The Rounds counter 603 is equal to the Maximum Number of Rounds 609. The player wins the game.

FIG. 7 shows a process flow describing a game. Two players are competing against each other. Game A creates a number and sends it to Game B, which confirms the receipt of the number. The players play the game, which records the score for each player, the number of operations for each player, and the time for each player. When Player B is finished, Game B sends the score, operation count, and time to Game A.

When Player A and Player B are both finished, Game A determines which player won the game. If one Player had a higher score than the other, that Player wins. If both players had the same score, Game A determines which player performed fewer operations. If one Player performed fewer operations during the game, that player wins. If both players had the same score and performed the same number of operations, Game A determines which player took the least amount of time. If one Player took less time than the other player, that Player wins. If both Player A and Player B had the same score, performed the same number of operations, and completed the game in the same amount of time, then the game is a draw.

In the games described above, the number x may be chosen randomly or it may be entered by the user. There may be one choice for the number x, or the player may choose from multiple possible values of x.

In the games described above, the value of the number y may be pre-selected by the designer of the game, it may be chosen randomly, or it may be chosen by the player. There may be one choice for the number y, or the player may choose from multiple possible values for y. The number y may be expressed by the user, or it may be inferred from another value entered (e.g., the difference between the current value of x and a new value for x).

In the games described above, the number z may be pre-selected by the designer of the game, it may be chosen by the player, or it may be chosen randomly. The number z may be a prime or non-prime number. The number y may or may not be a factor of z. The number z may or may not be a factor of y.
In the games described above, the game may determine when to check whether the number $x$ is divisible by $z$, or the user may indicate to the game that it should check whether the number $x$ is divisible by $z$.

In the games described above, the game may end after one repetition of the process described above. The game may continue after one repetition with new values of $x$, $y$, and/or $z$. The game may set the value $x$ to the new value, then repeat the process above with $x$ set to the new, altered value. The game may keep the new value for $x$ that is divisible by $z$. The game may divide the value $x$ by $z$ any number of times before repeating the process. The game may keep the values for $y$ from one repetition to the next. The game may change the values of $y$ from one repetition to the next.

In the games described above, the score or time may be reset between one game and another, or the score or time may be continued from one game to the next.

Having described certain embodiments of the game, other embodiments incorporating the concepts of the invention may also be used. Therefore, the invention should not be limited to certain embodiments, but rather should be limited only by the spirit and scope of the following claims.

What is claimed is:

1. A game wherein a player is scored on their ability to change a number $x$ so that it is divisible by or equal to a number $z$.

2. The method of claim 1 wherein a player is given a score based upon their ability to perform, on a number $x$, mathematical operations using a number $y$, such that the new value of $x$ is divisible by a number $z$.

3. The method of claim 1 wherein a player is timed as they perform mathematical operations on a number $x$, using a number $y$, such that the new value of $x$ is divisible by a number $z$.

4. The method of claim 1 wherein a player is given a score based upon the number of mathematical operations they perform using a number $y$, on a number $x$, such that the new value of $x$ is divisible by a number $z$.

5. The method of claim 1 wherein the player plays for their own best score.

6. The method of claim 1 wherein the player plays against a best possible score.

7. The method of claim 1 wherein the player plays against a score required to win the game.

8. The method of claim 1 wherein the player plays for their own best time.

9. The method of claim 1 wherein the player plays against a time required to win the game.

10. The method of claim 2 wherein the number $y$ can have several possible values within one game.

11. The method of claim 3 wherein the number $y$ can have several possible values within one game.

12. The method of claim 4 wherein the number $y$ can have several possible values within one game.

13. The method of claim 2 wherein multiple players compete for the best score.

14. The method of claim 3 wherein multiple players compete for the best time.

15. The method of claim 4 wherein multiple players compete for the fewest mathematical operations performed.

16. The method of claim 1 wherein a player is scored in an aggregate system based upon any combination of the metrics in the set of score, time, and number of mathematical operations performed.

17. The method of claim 1 wherein multiple players compete in an aggregate scoring system based upon any combination of the metrics in the set of score, time, and number of mathematical operations performed.

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