

MIPS Binary Game

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Overview:

The Binary Game is a text based MIPS Assembly program that quizzes the player on binary and decimal conversions.

The player must correctly answer a series of randomly generated questions to advance through levels. Each question is randomly generated to either convert a 8-bit binary number to a decimal number, or to convert a decimal number to a 8-bit binary number. The program uses ASCII based graphics for menus and game boards and the game includes sound effects for correct and incorrect answers.

Requirements:

Simulator:

- MARS 4.5 MIPS Assembler

Files Required:

- main.asm
- drawboard.asm
- convert.asm
- linevalidation.asm
- sound.asm
- SysCalls.asm

How to Run the Program:

1. Open MARS

Launch the MARS IDE and go to File → Open

2. Load the Program

Open every .asm file and ensure every file is listed at the top.

3. Assemble the Program

Navigate to main.asm and click Assemble, or press F3.

4. Run the Program

Click the Run button, or press F5. The Binary Game now appears in the console.

Playing the Game:

1. Main Menu

After launching the game, an ASCII based menu will appear that looks like this:

```
+=====+
|                BINARY GAME                |
|-----|
|  1) Start Game                             |
|  0) Quit                                   |
|-----|
|  Select Option:                           |
|-----+
```

- Enter 1 to Start the Game
- Enter 0 to quit the program

2. Gameplay

If the user selects to start the game, the screen will change to a new “Binary Arena” display for each level. The level number and question counter are displayed in the center of that. Each level contains as many questions as its level number (ex. Level 3 has 3 questions), and each question is randomly chosen to be Binary to Decimal or Decimal to Binary.

Binary to Decimal Question:

```
+=====+
|                BINARY  ARENA                |
|-----|
|                Level: 1                       |
|  Answer the questions to progress!           |
|-----+
| Question 1 of Level 1                        |
|-----+
| Binary: 01001100                            |
| Enter the decimal value (0..255): |
```

If the question happens to be a Binary to Decimal Question:

- The program displays a random 8-bit binary number as shown.
- Type the correct decimal equivalent (ex. 201) and press Enter.

Decimal to Binary Question:

```
+=====+
|               BINARY  ARENA               |
|-----|
|               Level: 1                     |
| Answer the questions to progress!          |
+=====+
+-----+
| Question 1 of Level 1                      |
+-----+
Decimal: 59
Enter an 8-bit binary (e.g., 01011010): |
```

If the question happens to be a Decimal to Binary Question:

- The program displays a random decimal number as shown.
- Type the correct 8-bit binary number (ex. 10101010) and press Enter. Make sure you enter exactly 8 bits or the program will throw an error message.

Feedback:

If your answer is correct, the message "Correct!" displays, and a short high pitched tone plays. If your answer is incorrect, the program displays the correct value and plays a low pitched tone. After completing all questions in the level, the game automatically will advance to the next level. After completing all 10 levels, the program returns to the main menu. From there, you can replay by selecting 1, or exit by selecting 0.