Computer Architecture
Assignment 1

Submission Guidelines

To reduce likelihood of misunderstandings, please follow these guidelines:

1. Work individually.
2. Submission date is 25/11/2024, 23:59.
3. Submission is through the “submit” system.
4. Make sure that your solution compiles and runs without any errors and warnings on BIU servers.
5. In the first line of every file you submit, write in a comment your id and full name. For example: “/* 123456789 Israela Israeli */”.
6. Do not use any AI agents (such as ChatGPT or Github Copilot) when writing your homework. Getting caught using tools as such will count as cheating just like any other method.
7. Use only AT&T syntax
8. You may always assume legal and correct input from the user
9. Ensure the submitted file name is "main.s" and that it compiles using the command "gcc main.s -no-pie"
10. For every question you have please use the course site forum.

A Guessing Game

In this assignment, we'll write a basic program using assembly, to demonstrate 'everyday' functionality. E.g: calling library functions, basic loops, conditions and defining global variables. We'll implement a number guessing game :) Here are its basics:

A number guessing game is a simple game that works by the following steps: first, the program prompts the user to enter a configuration value (to be later used with srand() and rand() library functions). Then, it generates a random number between 0 and N. After that, the program constantly prompts the user with the age-old question "What is your guess?". In each round, the user then inputs whatever number he thinks of. If the guess is incorrect, the program prints "Incorrect.". The application comes to a stop when either M iterations of the game are passed, or the user guesses the number correctly, whichever comes first. If the user guesses the correct number after less than M tries, it has won the game! Otherwise, the user has lost :(. The program will print a corresponding prompt in each case (will be detailed later).

To clarify, the random number does not change after every user guess, it is chosen at the start of the game

In addition to these basic rules, your game should support the following two features:

1. Double or Nothing:

If the user wins a round, the program will prompt them with the question: "Double or nothing! Would you like to continue to another round? (y/n)", and will wait for a response from the user. If the user enters 'y', the program will generate another random number and a new round will start, with N=N*2 this time. To change the seed and the random number generated, **you will multiply the seed by 2 as well**.
If the user enters 'n', the program will print "Congratz! You won X rounds!", where X is the number of rounds played by the user.

2. Easy mode:

Before the first round starts, after the program received the random seed from the user, the program will prompt them with "Would you like to play in easy mode? (y/n)". If the user chooses 'n', the program will run normally as described above, but if he chooses 'y', after every user guess, the program will tell them whether his guess was below or above the actual random number.

Your task is to implement this guessing game with initial N = 10 and M = 5. Write your code under a file named "main.s" and ensure it compiles using the command "gcc main.s -no-pie". After you are done, compare your outputs with the example outputs in the next page. They should be exactly equal.

Example Outputs

To avoid any misunderstandings, make sure your program outputs **exactly** the same messages as the examples below for the same inputs. Check that your strings are equal to the example, and that you multiplied your seed in exactly 2 in the 'Double or Nothing' feature.

```
Enter configuration seed: 2
Would you like to play in easy mode? (y/n) n
What is your guess? 3
Incorrect. What is your guess? 2
Incorrect. What is your guess? 4
Incorrect. What is your guess? 5
Incorrect. What is your guess? 6
Incorrect.
Game over, you lost :(. The correct answer was 1
```

```
Enter configuration seed: 5
Would you like to play in easy mode? (y/n) n
What is your guess? 5
Incorrect. What is your guess? 6
Double or nothing! Would you like to continue to another round? (y/n) y
What is your guess? 14
Incorrect. What is your guess? 16
Double or nothing! Would you like to continue to another round? (y/n) n
Congratz! You won 2 rounds!
```

```
Enter configuration seed: 9
Would you like to play in easy mode? (y/n) y
What is your guess? 5
Incorrect. Your guess was below the actual number ...
What is your guess? 7
Incorrect. Your guess was above the actual number ...
What is your guess? 6
Double or nothing! Would you like to continue to another round? (y/n) n
Congratz! You won 1 rounds!
```

Good Luck! 😊