1. In barebones.s, what does the first push command on line 14 do - that is, what is it pushing?

Pushing an 8-byte data from of base pointer to stack.

2. What do the commands in lines 18 and 19 do?

movq $1, %rax, moves value1 into register %rax

movq $1, %rdi, moves value 1 into register %rdi

3. What is a syscall? (You'll need to search to find the answer to this)

A computer program requests a service from the operating system on which it is executed (Wikipedia).

4. Which syscall is being run in line 22? Identify it by number (look for a table of syscalls that includes their numbers)

In line22, its `write` syscall, which is number 1.

5. We are setting up another syscall in line 24. Which command is it?

In line 24, its `exit` syscall, which is number 25.

6. Why is there a 13 in line 34?

13 is length of "Hello World!\n".

7. Use your tool to count the number of instructions that are required to execute your implementation of the guessing game program that you implemented in Homework01 using two different levels of optimization:
    1. When your program is compiled using the -O0 flag (copy your output for this optimization level into your word processing document). The optimization flag is the letter O and the number zero.

        There are 8 of add

        There are 63 of mov

        There are 0 of mul

        There are 7 of sub

        There are 1 of div

        There are 13 of lea

There are 1 of pop

There are 1 of ret

There are 1 of push

The number of instructions is 95

The number of cycles is approximately 147

2. When your program is compiled using the -O3 flag (copy your output for this optimization level into your word processing document). The optimization flag is the letter O and the number 3.

   There are 8 of add

   There are 14 of mov

   There are 1 of mul

   There are 12 of sub

   There are 0 of div

   There are 12 of lea

   There are 6 of pop

   There are 6 of ret

   There are 7 of push

   The number of instructions is 66

   The number of cycles is approximately 111

8. Given the result of your experiment in 7, do you think the cycle counts that we used as estimates are accurate? What instructions did the compiler try to eliminate at the highest level of optimization?

Yes. Instructions the compiler tries to eliminate at the highest level of optimization is mov and div.