1. What do the .data, .word, .text directives mean (i.e. what do you use them for)?

.data Subsequent items stored in Data segment at next available address

.word: store the listed value(s .word Store the listed value(s) as 32 bit words on word boundary

.text Subsequent items (instructions) stored in Text segment at next available address

1. How do you set a breakpoint in MARS? Set a breakpoint on line 14 and run to it. What is the instruction address? Has line 14 executed yet?

check boxes next to each instruction displayed in the Text Segment window

instruction address: 0x00400020 (the address of the instruction)

no

1. Once at a breakpoint, how do you continue to execute your code? How do you step through your code? Run the code to completion.

F5: run

F7: step through

1. Find the "Run I/O" window. What number did the program output? If 0 is the 0th fib number, which fib number is this?

F(9) = 34

1. At what address is n stored in memory? Try finding this by (1) looking at the Data Segment and (2) looking at the machine code (Code column in the Text Segment).

0x10010010

1. Without using the "Edit" tab, have the program calculate the 13th fib number (0-indexed) by *manually* modifying this memory location before execution. You may find it helpful to uncheck the "Hexadecimal Values" box at the bottom of the Data Segment.

233

1. How do you view and modify the contents of a register? Reset the simulation (Run-->Reset or F12) and now calculate the 13th fib number by (1) breaking at a well-chosen spot, (2) modifying a single register, and then (3) unsetting the breakpoint.

registers are on the right

break at line 11, when the n is loaded, then change it

1. Lines 19 and 21 use the syscall instruction. What is it and how do you use it? (Hint: look in Help)

syscall return the control of the register back to the operating system