

## Unit 02\_010 – Debugging, Registers, and Arithmetic

*Video Length 9:15*

1. What program will we be using for terminal debugging?
2. What program can we use for graphical debugging?

## Unit 02\_020 – Debugging with GDB

*Video Length 4:30*

3. Why are extra labels useful for debugging?
4. What flag must be added to allow assembly programs to be loaded into the gdb debugger?
5. What gdb command would be used to set a breakpoint at the `_exit` label? (You may do it with or without the asterisk)
6. What gdb command is used to run the program?
7. What gdb command is used to step through the next statement?
8. What gdb command is used to print the contents of the `rax` register in decimal? \_\_\_\_\_
9. What gdb command is used to print the contents of the `rax` register in hexadecimal? \_\_\_\_\_
10. What gdb command is used to print the contents of the `rax` register in binary? \_\_\_\_\_
11. What gdb command is used to print the contents of the `rax` register as an ASCII character?  
\_\_\_\_\_ (Note, I did not do it in the video, the format specifier is "c")

12. What gdb command would be used to print the contents of the sum label in hex. The value is stored in 1 byte. \_\_\_\_\_
13. What gdb command would be used to print the contents of the sum label in hex. The value is stored in 2 bytes. \_\_\_\_\_
14. What gdb command would be used to print the contents of the sum label in hex. The value is stored in 4 bytes. \_\_\_\_\_
15. What gdb command would be used to print the contents of the sum label in hex. The value is stored in 8 bytes. \_\_\_\_\_
16. What gdb command would be used to print all of the registers?

## Unit 02\_020 gdb part 2 –

*Video Length*

17. What question do you use to exit from gdb?

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\_\_\_\_\_

## Unit 02\_030 – debugging with kdbg

*Video Length 11:45*

18. Please try to run kdbg on your machine. Try to install it if you do not have it. Did it work? If you did get it to work, what did you have to do to get it working?

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## Unit 02\_040 – Register Recap

*Video Length*

19. Why are registers faster than memory?
  20. Are "General Purpose Registers" really general purpose? Explain your answer.
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## Unit 02\_050 – Registers

*Video Length*

21. What does GPR mean?
22. Which register is used as an accumulator for arithmetic operations and for return values from functions?
23. Which register is used as a base pointer?
24. Which register is used as a loop counter?
25. Which register is used as an I/O pointer and in multiplication and division?

Note: We are going to ignore the RSP and the RBP registers for now.

26. What eight GPRs were added to 64-bit systems?
27. What is the name of the Instruction Pointer? on 64-bit systems?
28. What is the name of the register that holds the flags on 64-bit systems?

## Unit 02\_060 – Register Sizes

*Video Length 4:30*

29. How are register sizes specified in x86 Assembler?
  30. What prefix was used for 16 bit registers on 8086 processors? (Warning: Trick question)
  31. What prefix is used when referring to 32-bit registers?
  32. What prefix is used when referring to 64-bit registers?
  33. What prefix would be used to refer to the entire 64 bits of the R12 register?
  34. What prefix would be used to refer to the lower 32 bits of the R12 register?
  35. What prefix would be used to refer to the lower 16 bits of the R12 register?
  36. What prefix would be used to refer to the lower 8 bits of the R12 register?
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## Unit 02\_065 – Moving LSB

*Video Length 13:00*

37. What does LSB stand for?
38. Assume that the RAX register contains a 64-bit value. What assembly language instruction would move the Least Significant 32 bits of the RAX to the RBX register?
39. In the video I was showed a preference for hex over decimal. Why is that?

## Unit 02\_075 – mov Program

### *Video Length*

note: I am asking only one question about each of the three parts of the program. However, ***you should know how each of the lines works, even if there is no question about it.***

40. Write the code needed for the .data section to declare memory labeled "widget" that will hold 32 bits and is initialized to 0.
41. Write the code that would move the LSB 16 bits of rbx register into the LSB 16 bits of the r8 register.
42. What system call that would move the 32 LSB of the R8 register into the widget memory location ?

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Do you have any questions or concerns? Please write any lingering questions you have here.

