# Practice Problems for Topic 7

## CIS*2030: Structure and Application of Microcomputers

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The practice problems below are important, but will *not* be marked. Their purpose is to ensure that you understand the major concepts covered in Topic 7. Doing these problems by yourself is imperative, as a portion of the marks on the final exam will be based on questions related to Topic 7.

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1. Although address register A7 behaves like A0 through A6 it has a second role. What is it?

2. How many (system) stack pointers are defined in the ISA of the 68000? Why is this the case?

3. Write 68000 assembly-language code to create a 256-longword user stack, called MYSTACK. Use A6 as the stack pointer and initialize A6 to the start of the (empty) stack.

4. Write a single 68000 assembly-language instruction to push the address of LABEL onto the previous (user) stack.

5. Write a single 68000 assembly-language instruction to push the address of LABEL onto the system stack.

6. Write a single 68000 assembly-language instruction to pop the word off of the top of the user stack (defined above in Q3) and push the word on top of the system stack.

7. If A7 contains the value $0000C000 just before the instruction MOVE.B #1,-(SP) executes, what (32-bit) hexadecimal value is contained in A7 after the previous instruction executes?

8. If A7 contains the value $0000C000 just before the instruction MOVE.W #1,-(SP) executes, what (32-bit) hexadecimal value is contained in A7 after the previous instruction executes?

9. Use a single instruction to save the registers D0,D1,D2,D3,D7,A0,A1 and A3 on the system stack.

10. Assume that 3 bytes are pushed onto the user stack (defined above in Q3). Copy the second byte from the stack into D0 withing changing the stack pointer, A6.

11. Assume that 3 bytes are pushed onto the system stack. Use on instruction to copy the second byte from the stack into D0 without change the system stack pointer.