Lecture #16 Worksheet, Answer Master

Fill in blanks to answer questions below. Then email this sheet to your TA.

1. **State the purpose of the desired program in Lecture 16.**

   System call 1 only prints out the content of $a0 in decimal form. The desired program will take a decimal number input and output it in <u>hex form</u>.

2. **What function does the program perform?**

   Inputs a decimal number up to 99,999,999, converts the number to hexadecimal, and prints it out.

3. **What is the step-by-step procedure in the program?**

   Input a decimal number, convert to binary and then to hex, convert each hex digit (= 1 nibble) to the ASCII character for that hex number, and finally output the ASCII value, which is the number in hex.

4. **Why does one not have to worry about converting to binary?**

   All numbers input to the computer are <u>automatically</u> converted to binary.

5. **Since the number is already binary, what must be done?**

   Represent the number as hex, then convert each hex digit to ASCII.

6. **State the problem with syscall 5.**

   It inputs numbers indiscriminately, so have to make sure number is not too big.

7. **Since numbers loaded into computer memory are already in binary form, what three steps will our program perform?**

   Isolate each 4-bit hex-number-equivalent in the number (starting with the most significant), convert it to the ASCII code for that hex number, and output it.

8. **Since the most significant digit will be 0, and there are possibly more leading zeroes for smaller numbers, how do we eliminate them?**

   Using a "zero elimination" routine to find the first non-zero hex digit.

9. **How do we separate and print out the hex digits, most-to-least-significant?**

   Do a rotate left 4, mask off the digit with 0xf and move to $a0, convert to ASCII, and print out. Thus we print numbers in order of significance.

10. **Study slides 9 & 10 to be sure you understand the flow of the program.**

11. **Why will our hex conversion program require a counter?**

    Each number will have 8 hex digits, and we must analyze all 8 (even though the first will always be 0), so we need to count to 8.

12. **State the loop key activities.**

    Rotate word left 4, And with 0xf and move result to $a0, convert to hex, and print.

13. **Compose the program, following the detailed directions in slides 13-32. Note that the completed program is shown in slides 33 and 34. Check the "completed" space below to show that you completed it.**

    Hex program completed. _____X_____

14. **Make sure you read the summary (slide 35) <u>carefully</u>!**

15. **Compose the program outlined on slide 36 (note that the program is shown on slide 37, but please try on your own. Program complete. _____X_____**

16. **Note the final assignment: Modify the hex number program as requested, then check the completed box below.**

    Modified program complete. _____X_____