

SPIM Class Programming Problem

(See syllabus for date of exercise)

You are to write the following program. A workable version of the program will be shown in class in the following session. Please complete the program at home after leaving class, enter it into Notepad® and run it successfully in SPIM. Your program is to do the following:

- 1. Input a number (using syscall 5) between 0 and 255.**
- 2. Check the number to assure it is within the limits.**
- 3. Convert this decimal number to binary and output the binary answer to the console.**
- 4. Note that since you really cannot output a number in binary form in SPIM, you will have to check each bit of the number, and output each 1 and 0 separately (either as #'s or as ASCII code for #'s, your choice).**
- 5. The magnitude of the number will always be 8 bits (1111 1111, = 255 decimal) or less.**
- 6. Leading zeroes are okay. This means that you will always have an 8-bit output, but there may be some leading zeroes, depending on the size of the number.**
- 7. Make sure you check the MSB of the number first and then go to the lower-significance bits, as you will be outputting characters representing the 1's and 0's in descending order on the console.**
- 8. Since you need \$v0 for many things, make sure to move the number input to \$t0 to test it.**
- 9. The next page is for programming. Note that the beginning of the program and the data declaration have been given.**

Decimal-to-Binary Conversion Program

```
# Converts a number between 0 and 255 to its binary equivalent and  
# outputs the binary number to the console.  
# Tests to make sure that the number is between 0 and 255 (0 to 1111 1111).
```

```
main:    .text
```

```
req:     .data  
ans:     .ascii "Input a decimal number between 0 and +255."  
crLf:    .ascii " is the binary equivalent of "  
mis:     .ascii "\n"  
mis:     .ascii "Error -- number is not within prescribed limits!"
```

```
# End of file, Decimal-to-Binary conversion Program.
```