Laboratory 6: Postlab

Date ______________________ Section ______________________

Name ______________________

Step 1

During the prelab exercises you have been, at the very least, annoyed by the fact that you could not correctly print unsigned integers. By using `print_int`, a large unsigned integer (larger or equal to 2^{31}) would print as a negative number. You now want to correct this by providing future users with a procedure that prints unsigned integers. You will write a procedure, named ‘PrintUnsigned’ which:

- receives the unsigned number to print in **`$a0`**
- converts the number to a null terminated ASCII string (the null character is 0x00)
- prints the string
- returns in $v0 the number of non-null characters in the printed ASCII string

Here is the C code for the integer to ASCII conversion function, `itoa()`. You will have to slightly modify it and use it in your implementation of ‘PrintUnsigned’.

P.1:

```
/* code for itoa() from "The C Programming Language" by Kernigan and Richie
*/

void reverse(char *s)
{
      int c, i, j;

      for( i=0, j=strlen(s)-1; i<j; i++, j--) {
            c=s[i];
            s[i]=s[j];
            s[j]=c;
}

void itoa(int n, char *s)
{
      int i, sign;

      if ((sign=n) < 0)
            n = -n;
      i=0;
      do {
            s[i++] = n%10 + '0';
      } while((n/=10) > 0);
      if (sign < 0)
```

```
            s[i] = '\0';
        reverse(s);
}
```

Hints:

- you will need to reserve space in 'PrintUnsigned' for the string you generate;
- make sure you use the appropriate (signed/unsigned) arithmetic functions

Step 2

Create a program called *lab6.13.asm* which you use to test 'PrintUnsigned', as follows:

- the program prints six times (in a loop) the value of a counter initialized to $2^{31} - 3$;
- at each iteration the program prints the counter using `print_int` and then the same counter using 'PrintUnsigned'
- at each iteration the counter is incremented by one using an unsigned operation

Run the program and complete the following test plan.

Test plan for *lab6.13.asm*

Counter	Printed by print_int	Printed by 'PrintUnsigned'

Step 3

Return to your lab instructor a copy of *lab6.13.asm* together with this postlab description. Ask your lab instructor whether copies of programs must be on paper (hardcopy), e-mail or both.