Homework – Print numbers 0 to *n-1*

This is a programming assignment that will be graded and scored as a homework since it is so simple.

Write a program for the LC3. This program should be named ***hwPrintN.hex.*** This hex file will be a machine language program for the LC3 processor.

This program will be written as an ASCII hex file.

DON'T TRY TO ASSEMBLE IT WITH AN LC3 ASSEMBLER.

The hex file must contain only hex characters; 0-9 and A-F with no x, X, 0x, or 0X.

Each line **MUST** be a four-digit hex number. Do not include a 0x or x at the beginning of this number.

The first line should be the starting address in memory, use 3000 to be safe.

The last line should be a halt (F025). Although you can put some data after halt if you want.

The lines between the first and last line should do the following:

> Print a number of digits specified in R1.
>
> These digits should start with 0 and count up and then stop at R1 – 1.
>
> For example:
>
> > If 5 is in R1, your program would print 01234
> >
> > If 9 is in R1, your program would print 012345678
>
> You can assume R1 will never be less than zero or greater than 10. You DO NOT have to do any type of error checking.
>
> DO NOT initialize R1 in your program. Assume the value will already be in R1 when your program starts.
>
> For testing, you should load your program into the simulator and then use the simulator to change R1 to some initial value by clicking on it and entering a value from 0 to 10.

Write your program in assembly. Convert it manually to hex. Put the hex in hwPrintN.hex.

Test your program using the simulator. Make sure to test with all possible values for R1.

Submit your hwPrintN.hex file to Web-CAT. Make sure you didn't name it hwPrintN.txt or that Notepad or WordPad didn't rename it hwPrintN.hex.txt.

NOTE: You will lose 1 point for every submission over 5. You will lose 10 points for each day late. Submitting more than 2 days late will result in a zero.

Note that late days start at 9:00 am. So submitting after 9:00 am on the due date will result in -10 points. Submitting after 9:00 am on the day after that will result in an additional -10 points. You will not be able to submit after 9:00 am on the day after that.

A possible algorithm.

```
Copy the ASCII code for zero to a register.  R0 would be easiest.
while (R1 indicates not done)
{
        print ascii
        ascii ++
        R1 --
}
```

The equivalent to the above in LC3 assembly might look something like this.

```
Copy the ASCII code for zero to a register.  R0 would be easiest.
If R1 indicated done, branch to end.
        print ascii
        add 1 to ascii
        R1 --
Branch back to if statement
```