Design Assignment 1:
Due Date: 2/25/2016

Q: Write, simulate, and demonstrate using AVRStudio6 an assembly code for the AVR ATMEGA328p microcontroller that performs the following functions:

a. Store 25 numbers starting from the RAMEND/2 location. Capture the lower 8bits of the variable/memory location RAM_MIDDLE = RAMEND/2 address and use them as your values. You can increment or decrement from RAM_MIDDLE location to get the subsequent 24 numbers. Use the X/Y/Z registers as pointers to fill up 25 numbers starting from location=RAM_MIDDLE.
b. Use X/Y/Z register to parse through the 25 numbers and add all numbers divisible by 7 and place the result in R20:21.
c. Use X/Y/Z register to parse through the 25 numbers and add all numbers divisible by 3 and place the result in R23:24. Parsing of the numbers for task b and c has to be done simultaneously.
d. Check and set register R07.3 if the sum is greater than 8-bits.
e. Determine the execution time @ 16MHz/#cycles of your algorithm using the simulation.

Submission:

The following are required for successful completion of the design assignment:

a. AVR assembly code that has been assembled and working.
b. The assembly code should be well documented with explanation of every instruction.
c. A word document that contains the flow chart of the assembly code along with the screenshots of the AVRStudio6 during debugging at the beginning and end of Task a, b, c and d.
d. Submit one solution folder, with doc and video/snapshot file

Points:
Task a: 20%, Task b:20%, Task c: 20%, Task d:10%, Submissions: 30%.