Design Assignment 1B: Due Date: See Website

Q: Write, simulate, and demonstrate using AVRStudio6/7 an assembly code for the AVR ATMEGA328p microcontroller that performs the following functions:

1. Store 250 numbers starting from the STARTADDS=0x0200 location. Populate the value of the memory location by adding high(STARTADDS) and low(STARTADDS). Use the X/Y/Z registers as pointers to fill up 250 numbers that are greater than 5 and less than 255. The numbers can be consecutive or random numbers.
2. Use X/Y/Z register addressing to parse through the 250 numbers, if the number is divisible by 5 store the number starting from memory location 0x0300, else store at location starting at 0x0500.
3. Use X/Y/Z register addressing to simultaneously add numbers from memory location 0x0300 and 0x0500 and store the sums at R17:R16 and R19:R18 respectively. Pay attention to the carry overflow.
4. Verify your algorithm and answers using C or any high-level program.
5. 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. Only the source files required.
b. The assembly code should be well documented with explanation of every instruction/module.
c. A word document that contains the assembly code along with the screenshots of the Atmel Studio 7 during debugging at the beginning and end of Task 1~5.
d. Submit one solution folder, with doc and video/snapshot file. See assignment submission guidelines through github posted in the class website.

Points:
Task 1~5: 100%. (Code=60%, Documentation=20%, Verification/Snapshots=20%)

Evaluation Rubrics:
See class website for the DA evaluation rubrics.