CS527 - Computer Systems
Graded Lab Assignment 1
Date: 5th Oct 2020 Deadline: 11th Oct 2020 11.59PM.
Max. marks: 40 points. Weightage: 2.5%.

General Guidelines:

(i) You need to upload a single zip file containing three files (one for each question, labelled *rollno_q*1, *rollno_q*2 and *rollno_q*3). Name the zip file with your roll number.

(ii) First three lines in the file should be - Your name, Roll no.

(iii) Include comments (to the point and sufficient) in the code for improved readability. This will also help you to recollect your logic for reuse and during evaluation.

(iv) Do not use any pseudo instructions.

(v) Submit before the deadline. Late submissions will be penalized.

(vi) Plagiarism will be treated seriously.

Question 1: Your promise in ALLCAPS in Assembly (5 Points)

Store the string "i, *your_name*, will not call instructor of cs527 sir!" at location 0x10001000. Convert it to all capitals and then store it at the location 0x10002000.

Marks split: 4 points for logic and 1 point for output.

Question 2: Finding Endianess of a machine in Assembly (5 Points)

Write an assembly program to identify Endianess of a machine. Register x10 should contain 0 if the machine is Little Endian and 1 if its Big Endian.

Marks split: 4 points for logic and 1 points for output.

Question 3: Implementing the Queue data structure in Assembly (30 Points)

Implement a Queue like structure at location 0x10000100 using Enqueue(), Dequeue(), Overflow(), Underflow(), Size() procedures.

Input:

1. Maximum Queue size, say 20.
2. Sequence of operations given as a string: E 10 E 20 D E 6 S D E 7 S ...

E stands for Enqueue, D stands for Dequeue, S stands for Size.

Implementation hint:

Your driver procedure should pick one character at a time from the input string, identify the operation, pick the remaining arguments from the string and call the appropriate procedure. Once the operation is done, the driver procedure will move to the next character.

Output:

1. Store strings "E Success", "D Success" upon successful enqueue and dequeue operation, respectively, at location 0x10000200.
2. For Size(), store the current queue size in register x15.
3. If hit underflow (overflow), store -1 (-2), respectively in register x10, and exit (reach fall-thru code with proper restoration of stack pointer).

*Marks split: 5 points for the driver procedure, 4 points for each procedure and 1 point for output of each procedure. Overall: 5 + 4*5 + 1*5*

All the best!