International Institute of Information Technology Hyderabad

Computer Systems Organization [Sections B1 and B2]

Assignment 1
Assembly Language Programming
Deadline: June 26, 2021 (Saturday), 23:55 PM
Total Marks: 100

1 Instructions:

- In total there are 5 questions in this assignment, each carries 20 marks. The questions assigned to you is attached in this link. This sheet is generated randomly and you need to strictly follow the questions assigned to you. If you won't you will be getting a **straight 0** for that question.

- You will need to submit a zip of folder(RollNumber) containing all your codes. Codes need to be named by their question number such as 1A, 2B ...

- **Strict action will be taken for copying in the Assignments.**

2 Problems:

1. **Question1**

   (a) Given a list L of 32 signed Integers each of 16 bits, sort them using **Bubble Sort**. The 32 integers will be stored in a data section of your code i.e store these integers in memory not in registers. You need to report the sorted list of integers.

   (b) Given a list L of 32 signed Integers each of 16 bits, sort them using **Selection Sort**. The 32 integers will be stored in a data section of your code i.e store these integers in memory not in registers. You need to report the sorted list of integers.

   (c) Given a list L of 32 signed Integers each of 16 bits, sort them using **Insertion Sort**. The 32 integers will be stored in a data section of your code i.e store these integers in memory not in registers. You need to report the sorted list of integers.

   (d) Given a list L of 32 signed Integers each of 16 bits, sort them using **Odd-Even Sort**. The 32 integers will be stored in a data section of your code i.e store these integers in memory not in registers. You need to report the sorted list of integers. Reference link

2. **Question2**

   (a) Given list L of 32 signed Integers each of 16 bits and a key X (16 bit). Find the location of X within L, return -1 if X does not belong to L. The list L is stored in memory inside the data section. You have to use **Sequential Search** to look for X within L. Report the number of iterations taken to successfully/unsuccessfully find X.

   (b) Given list L of 32 signed Integers each of 16 bits and a key X (16 bit). Find the location of X within L, return -1 if X does not belong to L. The list L is stored in memory inside the data section. You have to use **Binary Search** to look for X within L. Report the number of iterations taken to successfully/unsuccessfully find X. Reference link

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3. **Question3**

   (a) Given a Matrix M with 16 bit values in memory. M has 8 rows and 8 columns. Rotate the matrix by **90 degrees in the anticlockwise direction** without using any extra memory.

   (b) Given a Matrix M with 16 bit values in memory. M has 8 rows and 8 columns. Rotate the matrix by **90 degrees in the clockwise direction** without using any extra memory.

   Refernce link

[20]

4. **Question4**

   (a) Given a character array C of length 32. Count the frequency of each **small letter 'a' to 'z'** appearing in C. Report 0 in case an alphabet does not appear in C.

   (b) Given a character array C of length 32. Count the frequency of each **capital letter 'A' to 'Z'** appearing in C. Report 0 in case an alphabet does not appear in C.

[20]

5. **Question5**

   (a) Given two **16 bit signed** integers A and B. Find the **hamming distance** between them and store the result in another integer C. Refernce link

   (b) Given two **32 bit unsigned** integers A and B. Find the **hamming distance** between them and store the result in another integer C. Refernce link

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All the best!!!