National University of Computer and Emerging Sciences

COAL Lab

(EL2003)

Lab Mid Exam (A)

Date: October 17th 2024

Course Instructor(s)

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Total Time: 90 minutes
Total Marks: 20
Total Questions: 04

Semester: Fall-2024
Campus: Karachi
Dept: Computer science

- Create separate text files for each question and paste your solution code and create a word file for all screen shots of your outputs.
- Create a ZIP folder of all your files and copy it in the local storage with the title K23-xxxx_A.
- Submission is on local storage that can be accessed using win+r keys and entering \\172.16.5.43 address in the dialog box.
- Enter your username as khifast\K23xxxx and its assigned password.

CLO # 2:

Q1. **[5 marks]**

You are tasked with writing an assembly language program for a fitness tracker that monitors the number of steps taken and calories burned over two different weeks. The system should perform necessary calculations to adjust and analyze the data based on user input. The system should work with signed and unsigned values and perform various arithmetic and logical operations.

1. Start by defining an unsigned 16-bit integer (caloriesBurned) that stores the total calories burned during the week. Define two signed 8-bit integers (stepsWeek1 and stepsWeek2) to represent the number of steps taken in the first and second weeks.
2. Load the values of stepsWeek1 and stepsWeek2 into registers, ensuring the 8-bit signed integers are extended to 32-bit registers using sign-extension. Load the caloriesBurned value and zero-extend it to a 32-bit register.
3. Calculate the total steps by adding the values of stepsWeek1 and stepsWeek2.
4. After calculating total steps, decrement the number of steps taken in Week 2 (stepsWeek2) by a constant value (e.g., 5).
5. Swap the values of stepsWeek1 and stepsWeek2 in the registers to simulate a data error.

6. Subtract the adjusted steps in Week 2 from the caloriesBurned to determine if the calories burned are sufficient for the steps taken.
7. If the result indicates a deficit, negate it and store the final value in a register.
8. Output the final results: the total steps taken, adjusted steps for Week 2, and the result indicating whether there is a caloric deficit.

CLO # 2:

Q2. **[5 marks]**

Consider yourself a customer creating an account on an e-commerce website. Write an assembly program that inputs the username and card info (**your roll number**) and assigns a random generated account number to the user. The program should then display the assigned account number to the user in a message box. What is the output in Message Box? Explain.

CLO # 2:

Q3. **[5 marks]**

You are tasked with developing a Snack Inventory System for a convenience store that sells five types of snacks. The system will record sales for two weeks using indirect operands to access the arrays. After inputting sales data for each week, it will calculate the total sales for each snack type by summing the sales from both weeks. The program should display the total sales count for each snack type without using loops, relying on indirect operands for array access.

CLO # 2:

Q4. **[5 marks]**

Write an assembly program to construct the following pattern.

```
      6
    6 6 6
  6 6 6 6 6
6 6 6 6 6 6 6
    8 8 8
    8 8 8
    8 8 8
    8 8 8
```