**ECE 212 Lab - Introduction to Microprocessors**

**Department of Electrical and Computer Engineering**

**University of Alberta**



**Lab 3: Subroutines**

|  |  |
| --- | --- |
| **Student Name** | **Student ID** |
|  |  |
|  |  |

**\*\* Include your Marking Sheet.**

**Submission Date (Select):**

**27 March, 2017 (For Section H11)**

**28 March, 2017 (For Section H21)**

**29 March, 2017 (For Section H31)**

**30 March, 2017 (For Section H41)**

**Please submit to assignment box (Before 4.00 pm)**

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# Introduction

This lab deals with stack operation (push and pop), segmenting a long program/function into several smaller and simpler subroutines/sub-functions. … ….

In part A, …….

In Part B, ….

Finally, in Part C, …

# Design

## **Part A**

<Write your design about part A. >

## **Part A Flowchart**

<flow diagram of your design for Part A. Make it clear and complete. >

## **Part A Assembler Code**

<Write name at the beginning of your code.>

<Write comment in each line.>

## **Part B**

<Write your design about part B. Provide an example how did you find minimum and maximum value. >

## **Part B Flowchart**

<flow diagram of your design for Part B. Make it clear and complete>

## **Part B Assembler Code**

<Write name at the beginning of your code.>

<Write comment in each line.>

## **Part C**

<Write your design about part C.>

## **Part C Flowchart**

<flow diagram of your design for Part B. Make it clear and complete>

## **Part C Assembler Code**

<Write name at the beginning of your code.>

<Write comment in each line.>

# Testing

<**Don’t say** that you have just downloaded your code and run>

<Say about what are the conditions given and you tested all of them. For example, the number of input should be between 3-15, you intentionally put 30 and checked and put 0 and check and so on.>

## **Part A**

## **Part A testing**

<Write how did you test your part A>

## **Part A Screenshot**

<Screenshot>

<Explain your result>

## **Part B**

## **Part B testing**

<Write how did you test your part B>

## **Part B Screenshot**

<Screenshot>

<Explain your result>

## **Part C**

## **Part C testing**

<Write how did you test your part C>

## **Part C Screenshot**

<Screenshot>

<Explain your result>

# Questions

1. *Is it always necessary to implement either callee or caller preservation of registers when calling a subroutine. Why?*

**Answer:**

1. *Is it always necessary to clean up the stack. Why?*

**Answer:**

1. *If a proper check for the getstring function was not provided and you have access to the buffer, how would you check to see if a valid # was entered?* A detailed description is sufficient. You do not need to implement this in your code*.*

**Answer:**

# Conclusion