**PRE-LAB:**

Write the first draft of the program and determine the expected results (in memory or register) after each instruction by hand. **This must be completed before coming to the lab.**

**PROGRAMMING ASSIGNMENT:**

Write assembly programs to perform the following tasks. **Include brief comments explaining each instruction and result.** Your code should do the following:-

**Program 1: Swap Number1 and Number2 (Use r0 as a pointer)**

**In the data section**

1. Define a word variable called Number1 and initialize it with 0xAAAAAAAA
2. Define a word variable called Number2 and initialize it with 0xBBBBBBBB

**In the Code region**

1. Store the address of Number1 in r0 and then store the word at this address in r1
2. Store the address of Number2 in r0 and then store the word at this address in r2
3. Store r1 in the address pointed by r0
4. Store the address of Number1 in r0
5. Store r2 at this address pointed by r0

**Program 2: Filling up an array using register offset mode**

**In the data section**

1. Define an array with three elements called Array1. Each element is a word. Initialize the elements with zeros.

**In the Code region**

1. Copy the beginning address of the array (the base address) in r0
2. Copy 0xAAAAAAAA in r1
3. Copy r1 to the first element in the array using register offset mode where r0 is the base address and r2 is the offset – You need to set r2 with the proper offset to be for element 1.
4. Repeat steps 2 and 3 but this time (1) copy 0xBBBBBBBB in r1 (2) change the offset in r2 to be for element 2.
5. Repeat steps 2 and 3 but this time (1) copy 0xCCCCCCCC in r1 (2) change the offset in r2 to be for element 3.

If your program is correct, you should see these values in Array1 0xAAAAAAAA, 0xBBBBBBBB, 0xCCCCCCCC

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**Program 3: Copy an array to another**

**In the data section**

1. Define two arrays called Array1 and Array2. Each array has three elements and each element is a word. Initialize Array1 with 0xAAAAAAAA, 0xBBBBBBBB, and 0xCCCCCCCC and initialize Array2 with zeros.

**Use this for Code region**

Write a program to copy Array1 to Array2 using Post-Index addressing mode

1. You need to use two pointers; one for each array, e.g., r0 and r1
2. Initialize the two pointers so that r0 points at the beginning of Array1 and r1 points at the beginning of Array2
3. Read a word from the location pointed by r0 and copy it in another register (e.g., r2).
4. Copy r2 to the location pointed by r1
5. Update r0 and r1 to point at the next elements in the arrays
6. Repeat steps 3-5 to copy element 2
7. Repeat steps 3-5 to copy element 3

**Program 4: Repeat program 3 but using Pre-index with update addressing mode**

**You may need sub r0,#4 and sub r1,#4 after you initialize r0 and r1 with the beginning addresses of the two arrays**

**Program 5: Repeat program 3 but using Pre-index addressing mode**

**You may need sub r0,#4 and sub r1,#4 after you initialize r0 and r1 with the beginning addresses of the two arrays**

**You may also need add r0,#4 and add r1,#4 to update the two pointers**

**Things to turn in the lab report**

A. Your Code for the 5 programs. **[25 marks]**

B. The results you obtained after executing each program. **[5 marks]**