COMSATS University Islamabad, Lahore Campus

Department of Computer Engineering

Assignment 2 – SPRING 2025

Course Title:	Computer Organization & Architecture				Course Code:	CPE 343	Credit Hours: 4(3,1)
Course Instructor:	Dr. Muhammad Naeem Awais Mr. Moazzam Ali Sahi				Program Name:	BCE	
Semester:	4th	Batch:	FA23	Section: A, B	Date Given:	28th March, 2025	
Submission Date:	**9th April, 2025**				**Maximum Marks:**	**30**	
Name:					**Registration Number:**		

Important Instructions / Guidelines:

- Do your own work, PLAGARISM will be graded as ZERO
- **No late submission**.

Question 1: **[CLO2-PLO2-C3]** **[10 Marks]**

For the given piece of C code, ***produce*** the equivalent MIPS assembly code.

```
For (i = 20; i >= 0; i = i - 1)
        W[i+1] = X[i-1] + s*Y[i];
```

While generating the assembly code, assume that `W`, `X` and `Y` are arrays and their base addresses are in registers $s0 to $s2. Whereas `s` is a 32-bit number that corresponds to $t0 and `i` is an array index that corresponds to $t1.

Question 3: **[CLO2-PLO2-C3]** **[10 Marks]**

For the given piece of C code, ***produce*** the equivalent MIPS assembly code:

```
int find_max(int X[], int size)
     {
    int max = X[0];
    for (int i = 1; i < size; i++) {
        if (X[i] > max) {
            max = X[i];
        }
    }
    return max;
}
```

While generating the assembly code, assume that the base address of array `X` is in register $s0 and size variable is associated with $s1. Whereas variables max and i are associated with $t0 and $t1 respectively.

Question 2: **[CLO2-PLO2-C3]** **[10 Marks]**

For the given piece of C code, ***produce*** the equivalent MIPS assembly code using **STACK**.

```
void reverse_array(int X[], int size) {

    int left = 0, right = size - 1;

    while (left < right) {
```

```
            int temp = X[left];
            X[left] = X[right];
            X[right] = temp;
            left++;
            right--;
        }
    }
```

While generating the assembly code, assume that the base address of array `X` is in register $a0 and size variable is associated with $a1. Whereas variables left, right and temp are associated with $s0, $s1 and $t0 respectively.