**Due Date: 11/10/2024**

**Please answer All questions.**

**Part 1:**

**C++ code into assembly.**

**(For all variables values, please add the initialization instruction in MIPS before the**

**program).**

Q1) Translate the following C++ code into assembly:

#include <iostream>

using namespace std;

void summation\_3(int A[],int& sum){

for(int i=0; i<5;i++){

A[i]=A[i]+3;

sum = sum+3;

} }

int main(){

int A[]={1,2,3,­4,5};

int sum=0;

for(int i=0;i<5;i++)

cout<<A[i]<<endl;

summation\_3(A,sum);

for(int i=0; i<5;i++)

cout<<A[i]<<endl;

cout<<"The sum value is:"<<sum<<endl;

}

Q2) Translate the following C++ code into assembly:

#include <iostream>  
using namespace std;  
int main() {  
int A[] = {6, 34, -7, 3, 0, -20, 6, -2, 10};

int B[] = {3, -1, 2, -9, -1, 4, 6, 11, 4};

for (int i=0; i<9; i++) {

A[i]=A[i]+B[i]; }

for (int i=0; i<9; i++) {

cout << A[i] << endl;

}  
int sum = 0; // Start the total sum at 0.

for (int i=0; i<9; i++) {

sum = sum + A[i] + B[i]; // Add the next element to the total

sum++; }

cout << " Array elements sum = " << sum << endl;

return 0;  
}

**Part 2:**

MIPS assembly to C++ code.

Q3) Translate the following MIPS assembly code to C++ code:

(For any memory reference, you can use your **own defined values** and assign them to the corresponding variables/registers)

addi $t4, $zero, 5000 # initialize $t4

addi $t5, $zero, 5004 # initialize $t5

addi $t6, $zero, 5008 # initialize $t6

lw $t0, 0($t4) # Load DM[5000]

lw $t1, 0($t5) # Load DM[5004]

lw $t2, 0($t6) # Load DM[5008]

add $t3, $t0, $t1 # Add DM[5000] and DM[5004]

add $t3, $t3, $t2 # Add sum and DM[5008]

sw $t3, 0($t4) # Store sum to DM[5000]

addi $t6, $zero, 5000

lw $t0, 0($t6)

jal fun1

add $t2, $zero, $t1

addi $t1, $zero, 10

jal fun2

addi $t6, $zero, 5040

sw $t3, 0($t6)

j Done

fun1:

addi $t2, $zero, 40

slt $t3, $t0, $t2

bne $t3, $zero, R2

sub $t1, $t0, $t2

j R1

R2:

addi $t1, $zero, 0

R1:

jr $ra

fun2:

mul $t3, $t0, $t1

mul $t4, $t2, $t1

add $t3, $t3, $t4

jr $ra

Done: addi $t1, $zero, 2