Department of Artificial Intelligence and Multimedia Gaming Fundamentals of Programming

(Fall-2025)

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LAB No. 13

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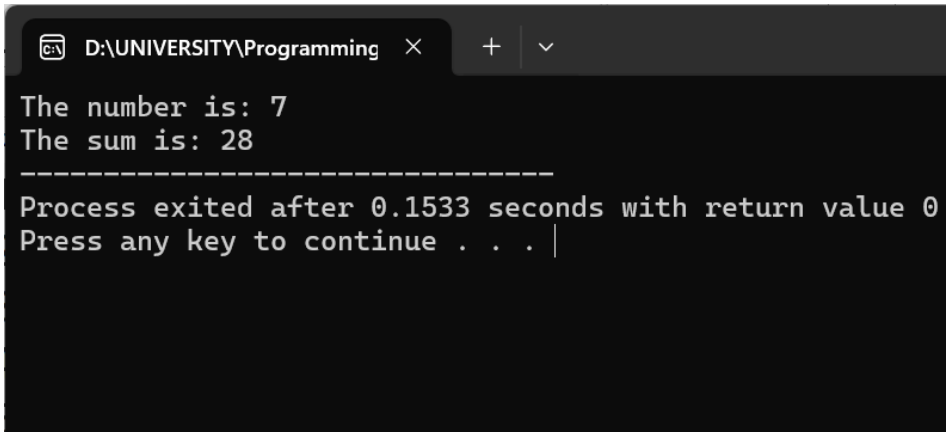
Task 1

Code:

task1.cpp

```cpp
#include<iostream>
using namespace std;
int sum(int n){
if(n==0){
return 0;
}
return n+sum(n-1);

}
int main(){
int n=7;
cout<<"The number is: "<<n<<endl;
cout<<"The sum is: "<<sum(n);
return 0;
}
```

Output:

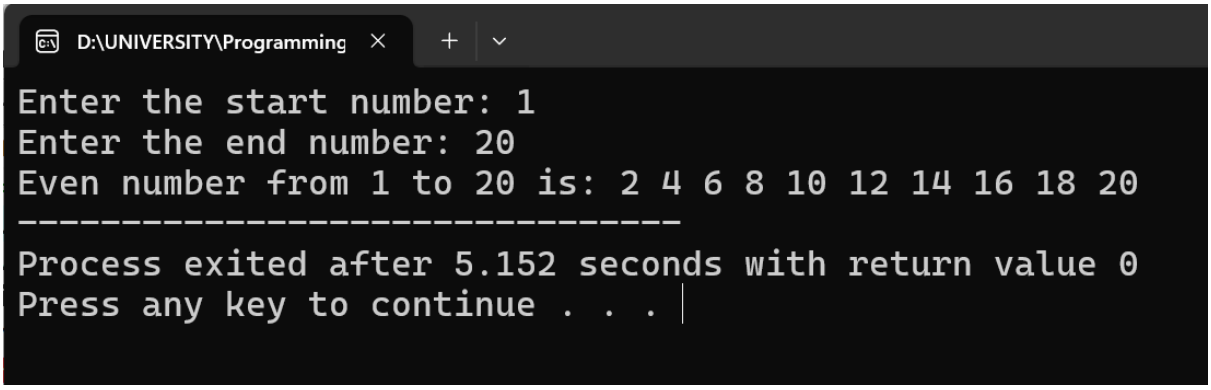


Task 2:

Code:

```
#include<iostream>
using namespace std;
void even(int start,int end){
if(start>end){
return;
}
if(start%2==0){
cout<<start<<" ";
}
even(start+1,end);
}
int main(){
int start,end;
cout<<"Enter the start number: ";
cin>>start;
cout<<"Enter the end number: ";
cin>>end;
cout<<"Even number from "<<start<<" to "<<end<<" is: ";
even(start,end);
return 0;
}
```

Output:

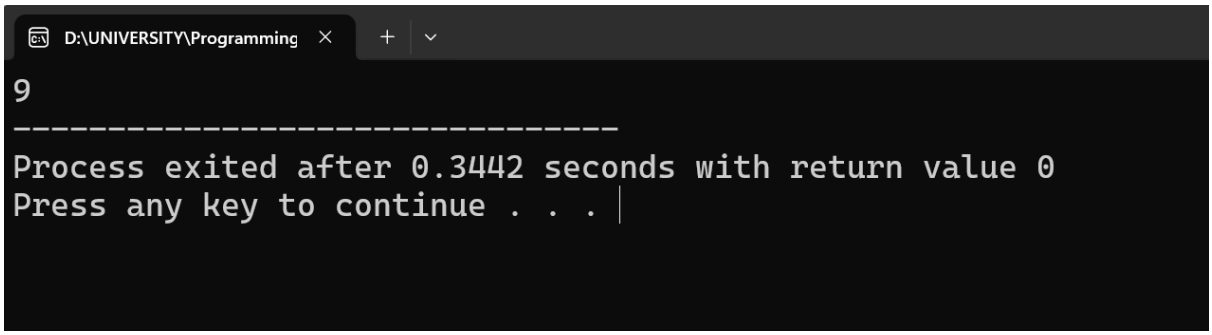


Task 3

Code:

```
#include<iostream>
using namespace std;
int pow(int base,int exp){
if(exp==0){
return 1;
}
return base*pow(base,exp-1);
}
int main(){
cout<<pow(3,2);
return 0;
}
```

Output:

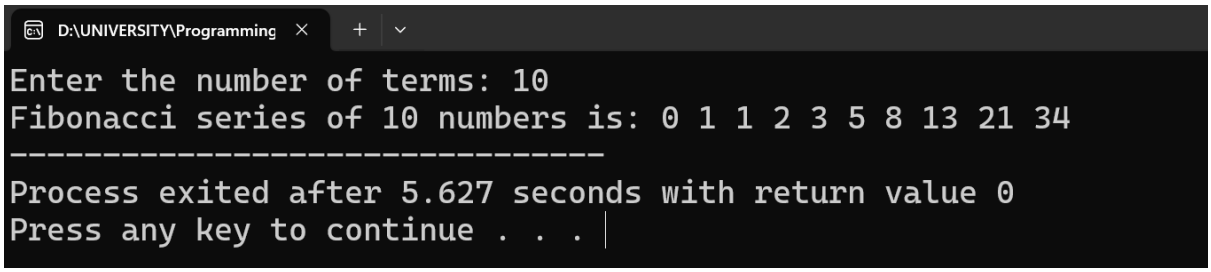


Task 4

Code:

```cpp
#include<iostream>
using namespace std;
int fab(int n){
if(n==0) return 0;
if(n==1) return 1;
return fab(n-1)+fab(n-2);
}
int main(){
int n;
cout<<"Enter the number of terms: ";
cin>>n;
cout<<"Fibonacci series of "<<n<<" numbers is: ";
for(int i=0;i<n;i++){
cout<<fab(i)<<" ";
}
return 0;
}
```

Output:

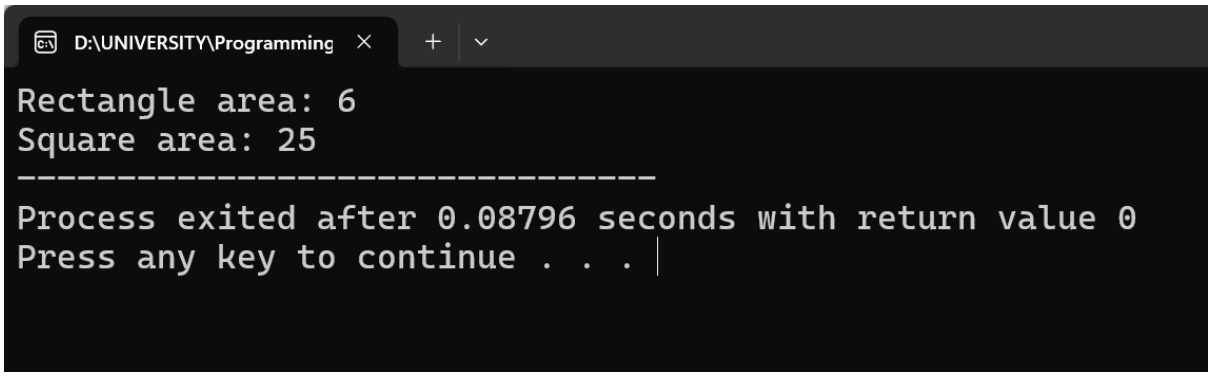


Task 5

Code:

```cpp
#include <iostream>
using namespace std;
int area(int width,int length){
return width*length;
}
int square(int length){
return length*length;
}
int main() {
cout<<"Rectangle area: "<<area(2,3)<<endl;
cout<<"Square area: "<<square(5);
    return 0;
}
```

Output:

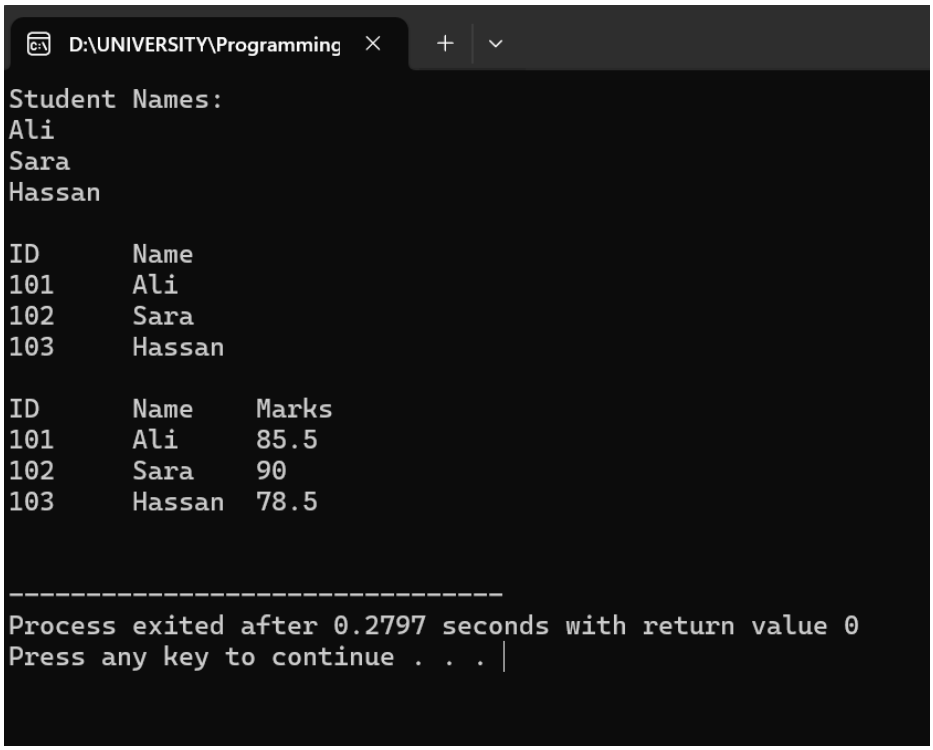


Task 6

Code:

```cpp
#include <iostream>
using namespace std;
void print_student_data(string names[], int n) {
    cout << "Student Names:" << endl;
    for (int i = 0; i < n; i++) {
        cout << names[i] << endl;
    }
    cout << endl;
}
void print_student_data(string names[], int ids[], int n) {
    cout << "ID\tName" << endl;
    for (int i = 0; i < n; i++) {
        cout << ids[i] << "\t" << names[i] << endl;
    }
    cout << endl;
}

void print_student_data(int ids[], string names[], float marks[], int n) {
    cout << "ID\tName\tMarks" << endl;
    for (int i = 0; i < n; i++) {
        cout << ids[i] << "\t" << names[i] << "\t" << marks[i] << endl;
    }
    cout << endl;
}

int main() {
    string names[] = {"Ali", "Sara", "Hassan"};
    int ids[] = {101, 102, 103};
    float marks[] = {85.5, 90.0, 78.5};
    int n = 3;

    print_student_data(names, n);
    print_student_data(names, ids, n);
    print_student_data(ids, names, marks, n);

    return 0;
}
```

Output:

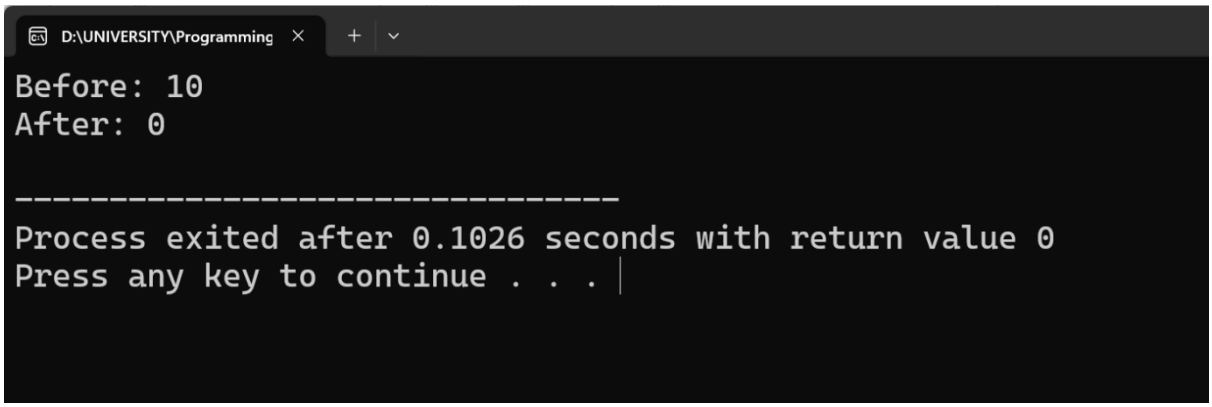


Task 7

Code:

```cpp
#include <iostream>
using namespace std;

void Make_zero(int &num) {
    num = 0;
}
int main() {
    int x = 10;
    cout << "Before: " << x << endl;

    Make_zero(x);

    cout << "After: " << x << endl;

    return 0;
}
```

Output:



Task 8

Code:

```cpp
#include <iostream>
using namespace std;
int* getMultiplesOf5(int arr[], int n, int &size) {
    static int multiples[100];
    size = 0;

    for (int i = 0; i < n; i++) {
        if (arr[i] % 5 == 0) {
            multiples[size] = arr[i];
            size++;
        }
    }

    return multiples;
}

int main() {
    int arr[] = {3, 5, 10, 12, 15, 18};
    int n = 6;
    int size;

    int* result = getMultiplesOf5(arr, n, size);

    cout << "Multiples of 5: ";
    for (int i = 0; i < size; i++) {
        cout << result[i] << " ";
    }
    cout << endl;

    return 0;
}
```

Output: