Lab's Scope:

- **Functions Part 1**

Problem 1:

Write a program having a function to convert a value sent to it from Egyptian pounds to dollars assuming that 1 dollar = 45.4 Egyptian pounds.

Solution:

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

void convert(float value)
{
    float dollars = value / 45.5;
    cout << "the amount in dollars is:" << dollars << endl;
}
////////////////////////////////////
int main() {
    float value;
    cout << "Enter the amount of money"<<endl;
    cin >>value;
    convert(value);
    return 0;
}
```

Problem 2 :

Write a program having a function called "getInput" that asks the student to enter his full name and his ID and prints them out. Your main application should only call the function.

Solution:

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

void getInput()
{
    string name;
    int ID;
    cout << "Enter your full name:" << endl;
    getline(cin, name);
    cout << "Enter your ID:" << endl;
    cin >> ID;
    cout << "You are:" << endl;
    cout << ID << " " << name <<endl;

}
////////////////////////////////////
int main() {
    getInput();
    return 0;
}
```

Problem 3:

Write a program having functions to check whether a number is odd or even.

Write two functions:

a) one that prints whether a number is even or odd from inside the function.
b) The second function returns true if the number is even, and false if the number is odd, and the printing occurs from the main.

Solution:

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

void check_1(int number)
{
    if (number % 2 == 0)
        cout << "The number is even."<< endl;
    else
        cout << "The number is odd." << endl;
}
////////////////////////////////////
bool check_2(int number)
{
    if (number % 2 == 0)
        return true;
    else
        return false;
}
////////////////////////////////////
int main() {
    int n;
    cout << "Enter a number"<<endl;
    cin >> n;
    check_1(n);
    bool even=check_2(n);
    if (even == true)
        cout << "The number is even." << endl;
    else
        cout << "The number is odd." << endl;

    return 0;
}
```

Problem 4:

Write a program having a function that is sent the user's age in years and prints out his age in days assuming that all years are 365 days.

Solution:

```
void getAge(int age)
{
    int days = age * 365;
    cout << "Your age in days is: "<<days<<endl;
}
////////////////////////////////////
int main() {
    int age;
    cout << "Enter your age in years:" << endl;
    cin >> age;
    getAge(age);
    return 0;
}
```

Problem 5:

Write a function that takes the start and end of a range of number and return the sum of all the numbers within that range to be printed by the main application.

Example:

If the start is 30 and the end is 45, then the sum = 30+31+32+…+45 = 600

Solution:

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

int getTotal(int start, int end)
{
    int total = 0;
    for (int i = start; i <= end; i++)
    {
        total += i;
    }
    return total;
}
////////////////////////////////////
int main() {
    int start, end;
    cout << "Enter your range start and end :" << endl;
    cin >> start>>end;
    int sum = getTotal(start,end);
    cout << "The sum is:" << sum;
    return 0;
}
```

Problem 6:

Write a function that takes a letter as a parameter and returns true if it is a vowel and false if it is a consonant. Assume that the user always enters a valid letter from the English alphabet.

Solution:

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

bool isVowel(char letter)
{
    switch (letter)
    {
    case 'A':
    case 'a':
    case 'E':
    case 'e':
    case 'O':
    case 'o':
    case 'U':
    case 'u':
    case 'I':
    case 'i': return true;

    default: return false;
    }
}

////////////////////////////////////
int main() {
    char letter;
    bool vowel;
    cout << "Enter a letter:" << endl;
    cin >> letter;
    vowel = isVowel(letter);
    if (vowel)     //This is the same as if (vowel == true)
        cout << "The letter is a vowel." << endl;
    else
        cout << "The letter is a consonant." << endl;
    return 0;
}
```

Problem 7:

Write a program having a function that takes a string as a parameter and the reverse of the string to be printed by the main application.

Example:

Enter a string:
hello everybody
ydobyreve olleh

Solution:

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

void reverse(string s)
{
    for (int i = s.length() - 1; i >= 0; i--)  //s.size() could be used
    {
        cout << s.at(i);
    }

}

////////////////////////////////////
int main() {
    string s;
    cout << "Enter a string:" << endl;
    getline(cin,s);
    reverse(s);
    return 0;
}
```

Problem 8:

Write a program having a function that given a word as a string, it checks whether this string is Palindrome or not. The function should return true if the string is Palindrome and false otherwise. Assume the user inputs all words in lowercase letters.
Palindromes in English are strings where the characters read the same backward as forward.

Examples are: civic, radar, level, madam

Solution:

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

// Function to check palindrome
bool isPalindrome(string str)
{

    int len = str.length();
    for (int i = 0; i < len / 2; i++) {
        if (str[i] != str[len - i - 1])
            return false;
    }
    return true;
}

int main()
{
    string sentence;
    cout << "Enter a sentence:" << endl;
    getline(cin, sentence);
    bool check = isPalindrome(sentence);
    if (check)
        cout << "The sentence is a Palindrome." << endl;
    else
        cout << "The sentence is not a Palindrome." << endl;
    return 0;

}
```

Problem 9:

Write a program having two functions, the first one is called “getInput” which takes input from the user representing the name of an Employee, his national id, and his position (the position could be “manager”, “staff”, or “admin”). This function should send the employee’s position to another function called “setSalary” to return the salary of the employee based on his position where a manager’s salary is 100,000, staff salary is 50,000, and admin’s salary is 40,000. Function “getInput” should then print all the information of the Employee.

The function headers should be as follows:

a) void getInput()
b) int setSalary (string position)

Solution:

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

int setSalary(string position)
{
    if (position == "manager")
        return 100000;

    else if (position == "staff")
        return 50000;

    else if (position == "admin")
        return 40000;

    else
        return 0;

}
//////////////////////////////////////////////////
void getInput()
{
    string name,position;
    int id;
    int salary;
    cout << "Enter Employee's name:" << endl;
    getline(cin, name);
    cout << "Enter Employee's Nantional ID:" << endl;
    cin >> id;
    cout << "Enter Employee's position:" << endl;
    cin>>position;
    salary = setSalary(position);
    cout << "Employee's name is:" <<name<< endl;
    cout << "Employee's National ID is:" << id << endl;
    cout << "Employee's position is:" << position << endl;
    cout << "Employee's salary is:" << salary << endl;
}
//////////////////////////////////////////////////////////
int main()
{
    getInput();
    return 0;

}
```

Problem 10:

An absolute value is the non-negative value of a number without regard to its sign (i.e. a positive value remains positive, and a negative value should be converted to its positive form).
Write a program having functions that print out the absolute value of a number sent to it. You should have a function that accepts an integer value, and another one that accepts a double value. Both functions should be called "absolute".

Solution:

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

void absolute(int x)
{
    int value;
    if (x > 0)
        value = x;
    else
        value = -x;
    cout << "The absolute value of " << x << " is " << value << endl;
}
////////////////////////////////////////////////////////
void absolute(double x)
{
    double value;
    if (x > 0)
        value = x;
    else
        value = -x;
    cout << "The absolute value of " << x << " is " << value << endl;
}

////////////////////////////////////////////////////////
int main()
{
    absolute(-3);
    absolute(-5.5);
    return 0;

}
```