Task 1:

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

void SquarePbyV(int);
void SquarePbyF(int&);

int main(){
    int num = 0;
    cout<<"Sample Input: Enter the number: ";
    cin>>num;
    cout<<"Expected Output:\n";
    cout<<"Square from function1: ";
    SquarePbyV(num);
    cout<<"Value from main: "<<num<<endl;
    cout<<"Square from function2: ";
    SquarePbyF(num);
    cout<<"Value from main: "<<num<<endl;
    cout<<"Square from function2: ";
    SquarePbyF(num);
    cout<<"Value from main: "<<num<<endl;
    cout<<"Square from function1: ";
    SquarePbyV(num);
    cout<<"Value from main: "<<num<<endl;
    return 0;
}

void SquarePbyV(int num){
    num *= num;
    cout<<num<<endl;
}
void SquarePbyF(int& num){
    num *= num;
    cout<<num<<endl;
}
```

Output:

```
Sample Input: Enter the number: 2
Expected Output:
Square from function1: 4
Value from main: 2
Square from function2: 4
Value from main: 4
Square from function2: 16
Value from main: 16
Square from function1: 256
Value from main: 16
PS C:\Users\saadg\Desktop>
```

```
Sample Input: Enter the number: 4
Expected Output:
Square from function1: 16
Value from main: 4
Square from function2: 16
Value from main: 16
Square from function2: 256
Value from main: 256
Square from function1: 65536
Value from main: 256
PS C:\Users\saadg\Desktop>
```

Task 2:

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


int SimilarCheck(int[], int[]);

int main(){
    int arr1[10], arr2[10];
    cout<<"Enter 10 elements in array 1: \n";
    for(int i=0; i<10; i++){
        cin>>arr1[i];
    }
    cout<<"Enter 10 elements in array 2: \n";
    for(int i=0; i<10; i++){
        cin>>arr2[i];
    }
    int count = 0;
    count = SimilarCheck(arr1, arr2);
    cout<<"Common elements in both arrays are: "<<count;
    return 0;
}

int SimilarCheck(int arr1[], int arr2[]){
```

```
    int count = 0;
    for(int i = 0; i<10; i++){
        for(int k = 0; k<10; k++){
            if (arr1[i] == arr2[k]){
                count++;
                break;
            }
        }
    }
    return count;
}
```

Output:

```
Enter 10 elements in array 1:
1
1
2
3
4
5
6
7
8
9
Enter 10 elements in array 2:
1
1
2
3
4
5
6
7
8
9
Common elements in both arrays are: 10
PS C:\Users\saadg\Desktop>
```

Task 3:

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


/*
```

```
COMMENTED BLOCK BELOW FOR GRID FUNCTION
IMPLEMENTATION IS A DIFFERENT APPROACH YET
UNSECCESSFUL 👇
*/

// void grid(int& row, int& col){
//     static char matrix[13][6];
//     if(matrix[row][col] == 'X'){
//         cout<<"\n\t\t***SEAT ALREADY
OCCUPIED***\n\n";
//     }
//     else {
//         cout<<"\tA\tB\tC\tD\tE\tF\n\n";
//         for(int i = 0; i<13; i++){
//             cout<<"Row "<<i+1;
//             for(int j = 0; j<6; j++){
//                 if(matrix[i][j] ==
matrix[row][col]){
//                     matrix[row][col] = 'X';
//                     cout<<"\tX";
//                 }
//                 else{
//                     if(matrix[i][j] == 'X'){
//                         break;
//                     }
//                     else {
//                         matrix[i][j] = '*';
//                     }
//                     cout<<"\t*";
//                 }
//             }
//             cout<<endl<<endl;
//         }
```

```
//     }
// }


/*
BELOW GRID FUNCTION IMPLEMENTATION IS SUCCESSFUL
APPROACH 👇
*/

void grid(int& row, int& col){
    static char matrix[13][6];

    if(matrix[row][col] == 'X'){
        cout << "\n\t\t***SEAT ALREADY
OCCUPIED***\n\n";
    }
    else {
        matrix[row][col] = 'X'; // Mark the seat as
booked
        cout << "\tA\tB\tC\tD\tE\tF\n\n";
        for(int i = 0; i < 13; i++){
            cout << "Row " << i + 1;
            for(int j = 0; j < 6; j++){
                if(matrix[i][j] == 'X'){
                    cout << '\t' << matrix[i][j];
                }
                else{
                    matrix[i][j] = '*';
                    cout << '\t' << matrix[i][j];
                }
            }
            cout << endl << endl;
        }
```

```
    }
}

int main(){
    int row, col, _class;
    cout<<"\n\t  **WELCOME TO SAAD INTERNATIONAL
AIRLINES**\n\n  ";

    while (true){
        cout<<"To Book a seat, Select which class
you want seat for: ";
        cout<<"\n 1. First Class";
        cout<<"\n 2. Business Class";
        cout<<"\n 3. Economy Class";
        cout<<"\n 4. EXIT PROGRAM\n\n";
        cin>> _class;
        switch(_class){
            case 1:
                cout<<"\nYOU CHOSE FIRST CLASS\n";
                cout<<"Enter row in which you want
seat (row 1 or row 2): ";
                cin>>row;
                while(row!=1 && row!=2){
                    cout<<"\nINVALID ROW IN FIRST
CLASS!";
                    cout<<"\nEnter row in which you
want seat (row 1 or row 2): ";
                    cin>>row;
                    if(row == 1 || row == 2){
                        break;
                    }
                }
```

```
                cout<<"Enter which seat in row
"<<row<<" you want (seat 1 to seat 6): ";
                cin>>col;
                while(col>6 || col<1){
                    cout<<"\nINVALID SEAT IN FIRST
CLASS!";
                    cout<<"\nEnter which seat in
row "<<row<<" you want (seat 1 to seat 6): ";
                    cin>>col;
                }
                row = row - 1;
                col = col - 1;
                grid(row, col);
            break;

            case 2:
                cout<<"\nYOU CHOSE BUSINESS
CLASS\n";
                cout<<"Enter row in which you want
seat (row 3 - row 7): ";
                cin>>row;
                while(row!=3 && row!=4 && row!=5 &&
row!=6 && row!=7){
                    cout<<"\nINVALID ROW IN
BUSINESS CLASS!";
                    cout<<"\nEnter row in which you
want seat (row 3 - row 7): ";
                    cin>>row;
                    if(row == 3 || row == 4 || row
== 5 || row == 6 || row == 7){
                        break;
                    }
                }
```

```
                cout<<"Enter which seat in row
"<<row<<" you want (seat 1 to seat 6): ";
                cin>>col;
                while(col>6 || col<1){
                    cout<<"\nINVALID SEAT IN
BUSINESS CLASS!";
                    cout<<"\nEnter which seat in
row "<<row<<" you want (seat 1 to seat 6): ";
                    cin>>col;
                }
                row = row - 1;
                col = col - 1;
                grid(row, col);
            break;

            case 3:
                cout<<"\nYOU CHOSE ECONOMY
CLASS\n";
                cout<<"Enter row in which you want
seat (row 8 - row 13): ";
                cin>>row;
                while(row!=8 && row!=9 && row!=10
&& row!=11 && row!=12 && row!=13){
                    cout<<"\nINVALID ROW IN ECONOMY
CLASS!";
                    cout<<"\nEnter row in which you
want seat (row 8 - row 13): ";
                    cin>>row;
                    if(row == 8 || row == 9 || row
== 10 || row == 11 || row == 12 || row == 13){
                        break;
                    }
                }
```

```
                cout<<"Enter which seat in row
"<<row<<" you want (seat 1 to seat 6): ";
                cin>>col;
                while(col>6 || col<1){
                    cout<<"\nINVALID SEAT IN
ECONOMY CLASS!";
                    cout<<"\nEnter which seat in
row "<<row<<" you want (seat 1 to seat 6): ";
                    cin>>col;
                }
                row = row - 1;
                col = col - 1;
                grid(row, col);
            break;

            case 4:
                cout<<"\t\t***YOU HAVE EXITED THE
PROGRAM***\n\n";
                exit(0);

            default:
                cout<<"INVALID SET OF INPUTS :(
!!!\n\n";
        }
        char ch;
        cout<<"\n\n-> Do you want to register
another seat? (y or n): ";
        cin>>ch;
        if (ch == 'y' || ch == 'Y'){
            continue;
        }
        else{
            break;
```

```
            }
        }
        return 0;
}
```

Output:

```
          **WELCOME TO SAAD INTERNATIONAL AIRLINES**

   To Book a seat, Select which class you want seat for:
  1. First Class
  2. Business Class
  3. Economy Class
  4. EXIT PROGRAM

 1

 YOU CHOSE FIRST CLASS
 Enter row in which you want seat (row 1 or row 2): 1
 Enter which seat in row 1 you want (seat 1 to seat 6): 1
         A       B       C       D       E       F

 Row 1   X       *       *       *       *       *

 Row 2   *       *       *       *       *       *

 Row 3   *       *       *       *       *       *

 Row 4   *       *       *       *       *       *

 Row 5   *       *       *       *       *       *

 Row 6   *       *       *       *       *       *

 Row 7   *       *       *       *       *       *

 Row 8   *       *       *       *       *       *

 Row 9   *       *       *       *       *       *

 Row 10  *       *       *       *       *       *

 Row 11  *       *       *       *       *       *

 Row 12  *       *       *       *       *       *

 Row 13  *       *       *       *       *       *
```

```
-> Do you want to register another seat? (y or n): y
To Book a seat, Select which class you want seat for:
 1. First Class
 2. Business Class
 3. Economy Class
 4. EXIT PROGRAM

1

YOU CHOSE FIRST CLASS
Enter row in which you want seat (row 1 or row 2): 2
Enter which seat in row 2 you want (seat 1 to seat 6): 2
        A       B       C       D       E       F

Row 1   X       *       *       *       *       *

Row 2   *       X       *       *       *       *

Row 3   *       *       *       *       *       *

Row 4   *       *       *       *       *       *

Row 5   *       *       *       *       *       *

Row 6   *       *       *       *       *       *

Row 7   *       *       *       *       *       *

Row 8   *       *       *       *       *       *

Row 9   *       *       *       *       *       *

Row 10  *       *       *       *       *       *

Row 11  *       *       *       *       *       *

Row 12  *       *       *       *       *       *

Row 13  *       *       *       *       *       *
```

```
-> Do you want to register another seat? (y or n): y
To Book a seat, Select which class you want seat for:
 1. First Class
 2. Business Class
 3. Economy Class
 4. EXIT PROGRAM

2

YOU CHOSE BUSINESS CLASS
Enter row in which you want seat (row 3 - row 7): 4
Enter which seat in row 4 you want (seat 1 to seat 6): 5
        A       B       C       D       E       F

Row 1   X       *       *       *       *       *

Row 2   *       X       *       *       *       *

Row 3   *       *       *       *       *       *

Row 4   *       *       *       *       X       *

Row 5   *       *       *       *       *       *

Row 6   *       *       *       *       *       *

Row 7   *       *       *       *       *       *

Row 8   *       *       *       *       *       *

Row 9   *       *       *       *       *       *

Row 10  *       *       *       *       *       *

Row 11  *       *       *       *       *       *

Row 12  *       *       *       *       *       *

Row 13  *       *       *       *       *       *
```

```
 -> Do you want to register another seat? (y or n): y
 To Book a seat, Select which class you want seat for:
  1. First Class
  2. Business Class
  3. Economy Class
  4. EXIT PROGRAM

 3

 YOU CHOSE ECONOMY CLASS
 Enter row in which you want seat (row 8 - row 13): 12
 Enter which seat in row 12 you want (seat 1 to seat 6): 3
         A       B       C       D       E       F

 Row 1   X       *       *       *       *       *

 Row 2   *       X       *       *       *       *

 Row 3   *       *       *       *       *       *

 Row 4   *       *       *       *       X       *

 Row 5   *       *       *       *       *       *

 Row 6   *       *       *       *       *       *

 Row 7   *       *       *       *       *       *

 Row 8   *       *       *       *       *       *

 Row 9   *       *       *       *       *       *

 Row 10  *       *       *       *       *       *

 Row 11  *       *       *       *       *       *

 Row 12  *       *       X       *       *       *

 Row 13  *       *       *       *       *       *



  -> Do you want to register another seat? (y or n): n
PS C:\Users\saadg\Desktop>
```

Task 4:

```cpp
#include <iostream>
using namespace std;
string name;   //Use of global variable

void organization(int& salary, int&experience){
    int baseSalary = salary;
    salary = baseSalary + (baseSalary*0.10);
    experience++;
```

```
}
int main(){
    int age, salary=99000, experience=0;    //Use of local variables
    cout<<"Enter name: ";
    cin>>name;
    cout<<"Enter Age: ";
    cin>>age;
    cout<<"\n\t**Information**\n";
    for(int i=0; i<6; i++){
        cout<<"\n\t-> After "<<i<<" years:\n";
        cout<<"\nName: "<<name<<"\nAge: "<<age<<"\nSalary:
"<<salary<<"\nExperience: "<<experience;
        organization(salary, experience);
    }
    return 0;
}
```

Output:

```
Enter name: Saad
Enter Age: 20

        **Information**

        -> After 0 years:

Name: Saad
Age: 20
Salary: 99000
Experience: 0
        -> After 1 years:

Name: Saad
Age: 20
Salary: 108900
Experience: 1
        -> After 2 years:

Name: Saad
Age: 20
Salary: 119790
Experience: 2
        -> After 3 years:

Name: Saad
Age: 20
Salary: 131769
Experience: 3
        -> After 4 years:

Name: Saad
Age: 20
Salary: 144945
Experience: 4
        -> After 5 years:

Name: Saad
Age: 20
Salary: 159439
Experience: 5
PS C:\Users\saadg\Desktop>
```