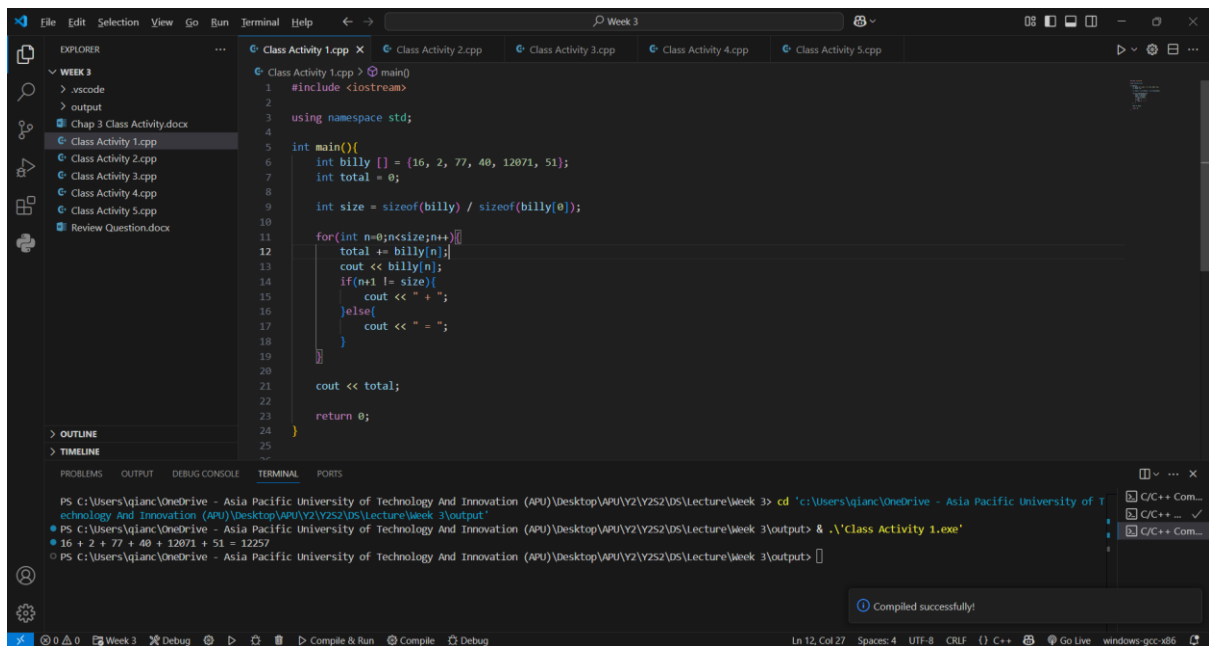


## Chap 3

### Class Activity 1

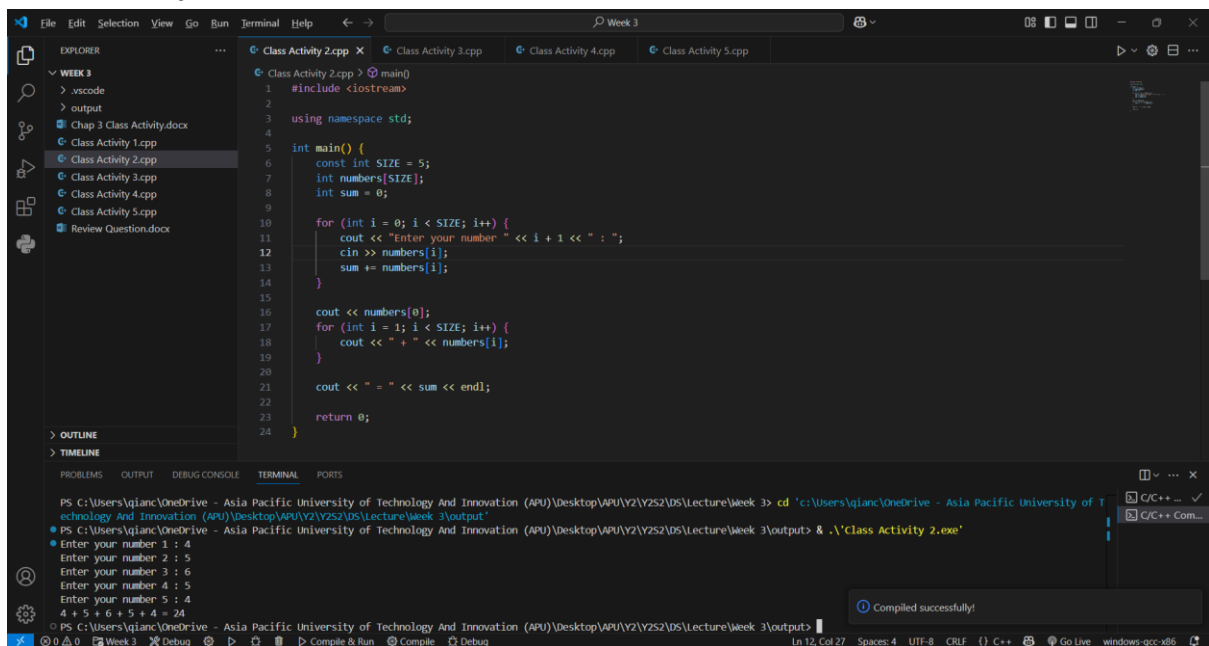


The screenshot shows the Visual Studio Code interface with the file explorer on the left displaying the project structure for 'Week 3'. The main editor window shows 'Class Activity 1.cpp' with the following code:

```
1 #include <iostream>
2
3 using namespace std;
4
5 int main(){
6     int billy [] = {16, 2, 77, 40, 12071, 51};
7     int total = 0;
8
9     int size = sizeof(billy) / sizeof(billy[0]);
10
11     for(int n=0;n<size;n++){
12         total += billy[n];
13         cout << billy[n];
14         if(n+1 != size){
15             cout << " + ";
16         }else{
17             cout << " = ";
18         }
19     }
20
21     cout << total;
22
23     return 0;
24 }
```

The terminal at the bottom shows the command to compile and run the program, and the output displays the sum of the array elements: 16 + 2 + 77 + 40 + 12071 + 51 = 12257.

### Class Activity 2

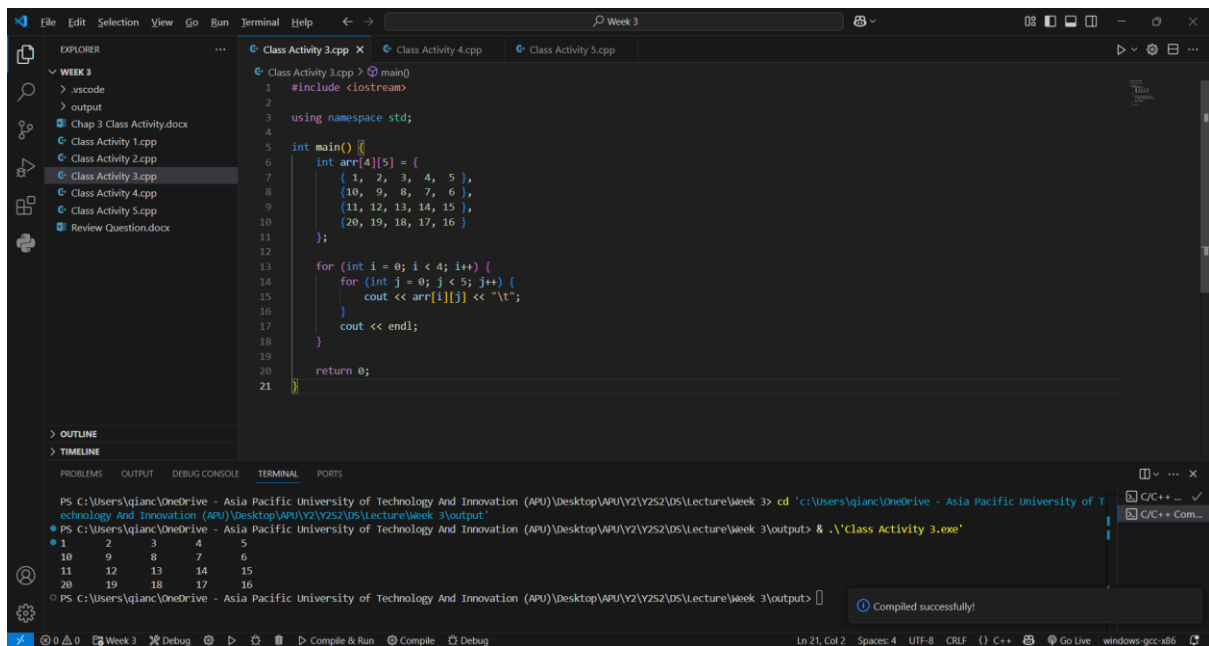


The screenshot shows the Visual Studio Code interface with the file explorer on the left displaying the project structure for 'Week 3'. The main editor window shows 'Class Activity 2.cpp' with the following code:

```
1 #include <iostream>
2
3 using namespace std;
4
5 int main() {
6     const int SIZE = 5;
7     int numbers[SIZE];
8     int sum = 0;
9
10    for (int i = 0; i < SIZE; i++) {
11        cout << "Enter your number " << i + 1 << " : ";
12        cin >> numbers[i];
13        sum += numbers[i];
14    }
15
16    cout << numbers[0];
17    for (int i = 1; i < SIZE; i++) {
18        cout << " + " << numbers[i];
19    }
20
21    cout << " = " << sum << endl;
22
23    return 0;
24 }
```

The terminal at the bottom shows the command to compile and run the program, and the output displays the sum of the five entered numbers: 4 + 5 + 6 + 5 + 4 = 24.

## Class Activity 3



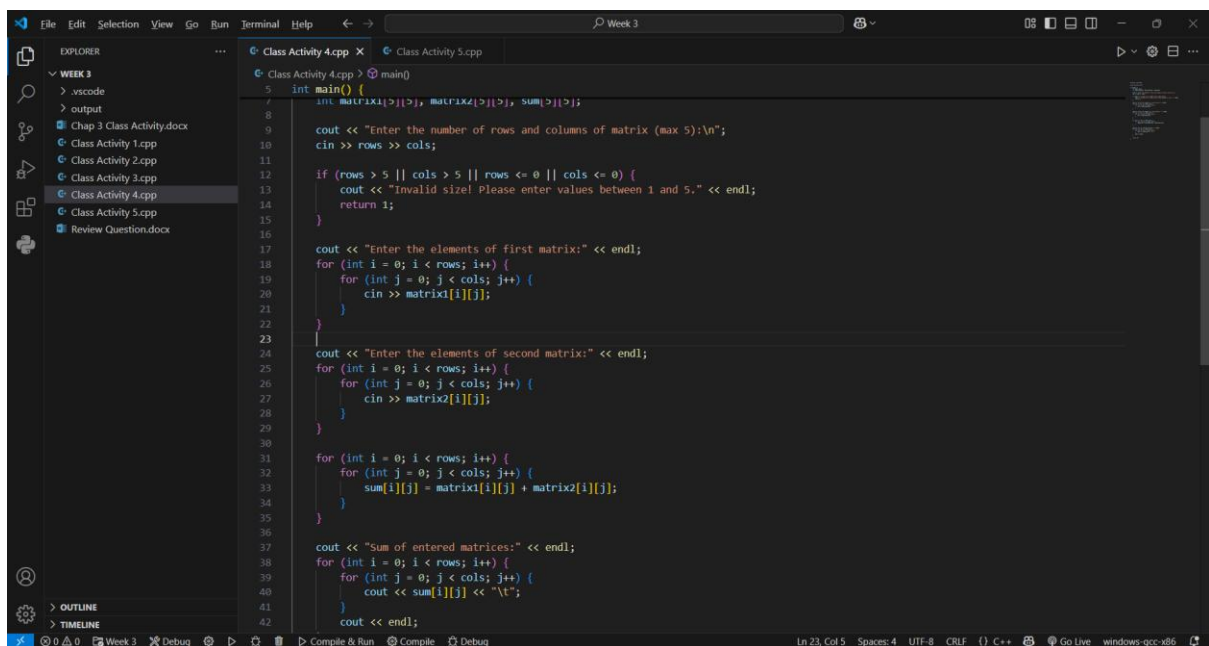
The screenshot shows the Visual Studio Code editor with the file `Class Activity 3.cpp` open. The code defines a 5x5 integer array and prints its elements using nested loops. The terminal window shows the command to compile and run the program, resulting in the output of the array elements.

```
1 #include <iostream>
2
3 using namespace std;
4
5 int main() {
6     int arr[5][5] = {
7         { 1, 2, 3, 4, 5 },
8         {10, 9, 8, 7, 6 },
9         {11, 12, 13, 14, 15 },
10        {20, 19, 18, 17, 16 }
11    };
12
13    for (int i = 0; i < 5; i++) {
14        for (int j = 0; j < 5; j++) {
15            cout << arr[i][j] << " ";
16        }
17        cout << endl;
18    }
19
20    return 0;
21 }
```

Terminal Output:

```
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3> cd 'C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output'
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output> g++ -std=c++11 -o 'C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output\class Activity 3.exe' class Activity 3.cpp
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output> .\class Activity 3.exe
1 2 3 4 5
10 9 8 7 6
11 12 13 14 15
20 19 18 17 16
```

## Class Activity 4

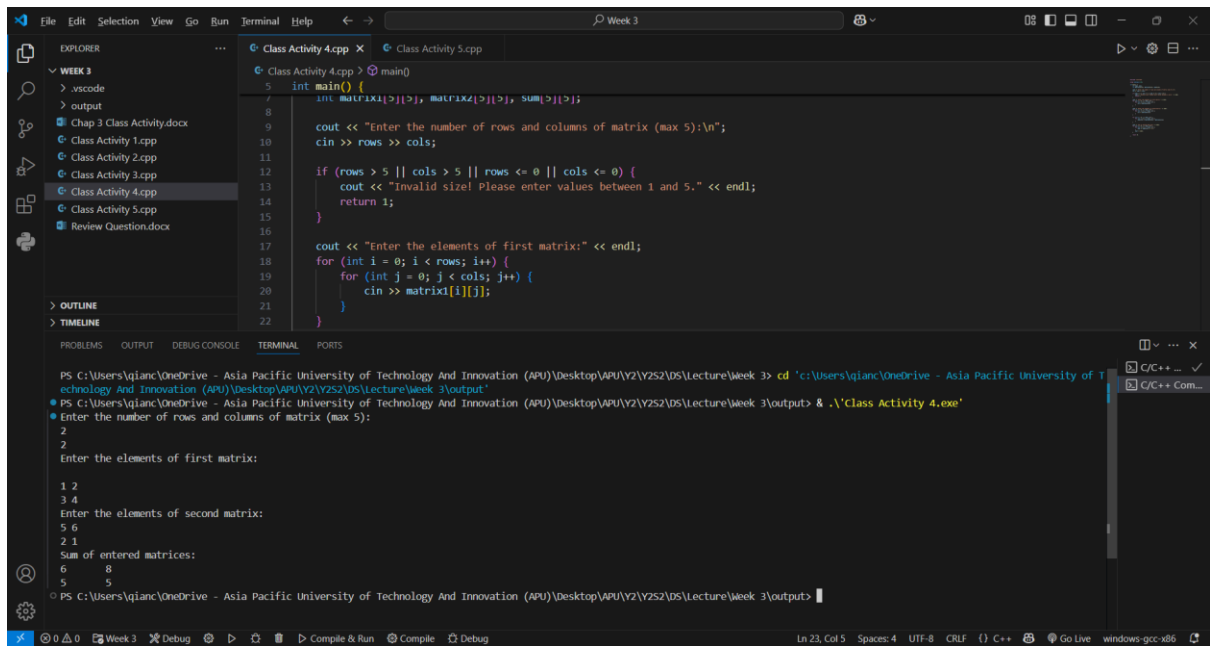


The screenshot shows the Visual Studio Code editor with the file `Class Activity 4.cpp` open. The code prompts the user to enter the dimensions of two matrices, reads their elements, and calculates their sum. The terminal window shows the execution of the program.

```
5 int main() {
6     int matrix1[5][5], matrix2[5][5], sum[5][5];
7
8     cout << "Enter the number of rows and columns of matrix (max 5):\n";
9     cin >> rows >> cols;
10
11     if (rows > 5 || cols > 5 || rows <= 0 || cols <= 0) {
12         cout << "Invalid size! Please enter values between 1 and 5." << endl;
13         return 1;
14     }
15
16     cout << "Enter the elements of first matrix:" << endl;
17     for (int i = 0; i < rows; i++) {
18         for (int j = 0; j < cols; j++) {
19             cin >> matrix1[i][j];
20         }
21     }
22
23     cout << "Enter the elements of second matrix:" << endl;
24     for (int i = 0; i < rows; i++) {
25         for (int j = 0; j < cols; j++) {
26             cin >> matrix2[i][j];
27         }
28     }
29
30     for (int i = 0; i < rows; i++) {
31         for (int j = 0; j < cols; j++) {
32             sum[i][j] = matrix1[i][j] + matrix2[i][j];
33         }
34     }
35
36     cout << "Sum of entered matrices:" << endl;
37     for (int i = 0; i < rows; i++) {
38         for (int j = 0; j < cols; j++) {
39             cout << sum[i][j] << " ";
40         }
41     }
42     cout << endl;
43 }
```

Terminal Output:

```
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3> cd 'C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output'
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output> g++ -std=c++11 -o 'C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output\class Activity 4.exe' class Activity 4.cpp
PS C:\Users\qlanc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\DS\Lecture\Week 3\output> .\class Activity 4.exe
Enter the number of rows and columns of matrix (max 5):
5 5
Enter the elements of first matrix:
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
Enter the elements of second matrix:
26 27 28 29 30
31 32 33 34 35
36 37 38 39 40
41 42 43 44 45
46 47 48 49 50
Sum of entered matrices:
27 29 31 33 35
37 39 41 43 45
47 49 51 53 55
57 59 61 63 65
67 69 71 73 75
```



## Class Activity 5

The image shows two screenshots of the Visual Studio Code editor. The top screenshot displays the source code of `Class Activity 5.cpp`. The code defines a `displayMarks` function and a `main` function. The `main` function prompts the user to enter the number of students (max 10), then for each student, it prompts for a name and a mark, and finally calls `displayMarks` to print the results.

```
1 // Class Activity 5.cpp
2 #include <iostream>
3 using namespace std;
4
5 void displayMarks(string names[], int marks[], int n) {
6     cout << "\nDisplaying marks:\n";
7     for (int i = 0; i < n; i++) {
8         cout << "Student " << (i + 1) << " (" << names[i] << "): " << marks[i] << endl;
9     }
10 }
11
12 int main() {
13     int n;
14
15     cout << "Enter the number of students (max 10): ";
16     cin >> n;
17
18     if (n > 10 || n <= 0) {
19         cout << "Invalid number! Please enter between 1 and 10 students.\n";
20         return 1;
21     }
22
23     string names[10];
24     int marks[10];
25
26     for (int i = 0; i < n; i++) {
27         cout << "Enter name for Student " << (i + 1) << ": ";
28         cin >> names[i];
29
30         cout << "Enter marks for " << names[i] << ": ";
31         cin >> marks[i];
32     }
33
34     displayMarks(names, marks, n);
35
36     return 0;
37 }
```

The bottom screenshot shows the same code with the `main` function partially visible. The terminal window at the bottom shows the execution of the program. It prompts for the number of students (5), then for each student's name and mark, and finally displays the marks for each student.

```
PS C:\Users\qianc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\OS\Lecture\Week 3> cd 'C:\Users\qianc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\OS\Lecture\Week 3\output'
PS C:\Users\qianc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\OS\Lecture\Week 3\output> cd 'C:\Users\qianc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\OS\Lecture\Week 3\output' & .\Class Activity 5.exe
Enter the number of students (max 10): 5
Enter name for Student 1: John
Enter marks for John: 88
Enter name for Student 2: Mary
Enter marks for Mary: 76
Enter name for Student 3: Alice
Enter marks for Alice: 90
Enter name for Student 4: Max
Enter marks for Max: 61
Enter name for Student 5: Ron
Enter marks for Ron: 69

Displaying marks:
Student 1 (John): 88
Student 2 (Mary): 76
Student 3 (Alice): 90
Student 4 (Max): 61
Student 5 (Ron): 69
PS C:\Users\qianc\OneDrive - Asia Pacific University of Technology And Innovation (APU)\Desktop\APU\Y2\Y2S2\OS\Lecture\Week 3\output>
```