

Repetition Control Structures-II

Objectives of the Lecture

- Sentinel-Controlled while Loops.
- Example 1: Average of numbers.
- Example 2: Telephone Digits.

Sentinel-Controlled while Loops

- Sentinel variable is tested in the condition.
- Loop ends when sentinel is encountered.

```
cin >> variable;           //initialize the loop control variable

while (variable != sentinel) //test the loop control variable
{
    .
    .
    .
    cin >> variable;       //update the loop control variable
    .
    .
    .
}
```

Example 1: Average of numbers

//Program: Sentinel-Controlled Loop

```
#include <iostream>
using namespace std;
const int SENTINEL = -999;
int main()
{
    int number;           //variable to store the number
    int sum = 0;          //variable to store the sum
    int count = 0;        //variable to store the total
                          //numbers read
    cout << "Line 1: Enter integers ending with "
         << SENTINEL << endl;           //Line 1
    cin >> number;                   //Line 2
    while (number != SENTINEL)       //Line 3
    {
        sum = sum + number;          //Line 4
        count++;                     //Line 5
        cin >> number;               //Line 6
    }
}
```

```

}
cout << "Line 7: The sum of the " << count
    << " numbers is " << sum << endl;           //Line 7
if (count != 0)                                 //Line 8
    cout << "Line 9: The average is "
        << sum / count << endl;               //Line 9
else                                             //Line 10
    cout << "Line 11: No input." << endl;     //Line 11
return 0;
}

```

Example 2: Telephone Digits

```

//*****
// Program: Telephone Digits
// This is an example of a sentinel-controlled loop. This
// program converts uppercase letters to their corresponding
// telephone digits.
//*****
#include <iostream>
using namespace std;
int main()
{
    char letter;                                //Line 1
    cout << "Program to convert uppercase "
        << "letters to their corresponding "
        << "telephone digits." << endl;         //Line 2
    cout << "To stop the program enter #."
        << endl;                                //Line 3
    cout << "Enter a letter: ";                 //Line 4
    cin >> letter;                              //Line 5
    cout << endl;                               //Line 6
    while (letter != '#')                       //Line 7
    {
        cout << "The letter you entered is: "
            << letter << endl;                 //Line 8
        cout << "The corresponding telephone "
            << "digit is: ";                   //Line 9
        if (letter >= 'A' && letter <= 'Z')    //Line 10
            switch (letter)                    //Line 11
            {
                case 'A':
                case 'B':
                case 'C':
                    cout << 2 << endl;         //Line 12
                    break;                     //Line 13
                case 'D':
                case 'E':

```

```

        case 'F':
            cout << 3 << endl;           //Line 14
            break;                       //Line 15
        case 'G':
        case 'H':
        case 'I':
            cout << 4 << endl;           //Line 16
            break;                       //Line 17
        case 'J':
        case 'K':
        case 'L':
            cout << 5 << endl;           //Line 18
            break;                       //Line 19
        case 'M':
        case 'N':
        case 'O':
            cout << 6 << endl;           //Line 20
            break;                       //Line 21
        case 'P':
        case 'Q':
        case 'R':
        case 'S':
            cout << 7 << endl;           //Line 22
            break;                       //Line 23
        case 'T':
        case 'U':
        case 'V':
            cout << 8 << endl;           //Line 24
            break;                       //Line 25
        case 'W':
        case 'X':
        case 'Y':
        case 'Z':
            cout << 9 << endl;           //Line 26
    }
else //Line 27
    cout << "Invalid input." << endl; //Line 28
cout << "\nEnter another uppercase "
    << "letter to find its "
    << "corresponding telephone digit."
    << endl; //Line 29
cout << "To stop the program enter #."
    << endl; //Line 30
cout << "Enter a letter: "; //Line 31
cin >> letter; //Line 32
cout << endl; //Line 33
} //end while
return 0;
}

```