The for Loop

Class 16

Input Validation

- a common use for a while or a do-while loop is input validation

```
int act_score;
// this program validates the input entered in the program
// the input value should be greater than 0 and less than 37


cout<<"\nEnter act score: ";
cin>> act_score;
while (not (act_score>0 && act_score<37))
{
    cout<<"\nInvalid value; enter act score: ";
    cin>> act_score;

}

// now act_score is valid, so use it
```

Loops: Break

- break is a keyword. We can use it to stop a loop
- When the break condition is true, the loop will stop and will skip its remaining iterations

```
for(int i=1; i<=5; i ++)
{
      if(i == 4) { break; }

      cout<< i <<" ";
}
```

>>The output of the above program would be the following:

1 2 3

Loops: Continue

- continue is a keyword, we can use it inside the loop
- When the continue condition is true, we skip the current iteration of the loop. It does not stop the remaining iterations

```
for(int i=1; i<=5; i ++)
{
      if(i == 4) { continue; }

      cout<< i <<" ";
}
```

>>The output of the above program would be the following:

```
1 2 3 5
```

Nested Loops

- a loop that is inside another loop is called a nested loop
- also, see program clock.cpp

```
for(int i=1; i<=3; i ++)
{       for(int j=1;j<=2; j++)
        {       cout<< i <<" "<<j<<endl;
        }
}
```

For each iteration of the outer loop, the inner loop will complete all of its iterations. Hence the output of the program would be

```
1  1
1  2
2  1
2  2
3  1
3  2
```

Nested Loops

- a loop that is inside another loop is called a nested loop

```
for(int i=1; i<=4; i ++)
{       for(int j=1;j<=5; j++)
        {       cout<< i <<" "<<j <<" | ";
        }
        cout<<endl;
}
```

For each iteration of the outer loop, the inner loop will complete all of its iterations. Hence the output of the program would be

1 1 | 1 2 | 1 3 | 1 4 | 1 5 |

2 1 | 2 2 | 2 3 | 2 4 | 2 5 |

3 1 | 3 2 | 3 3 | 3 4 | 3 5 |

4 1 | 4 2 | 4 3 | 4 4 | 4 5 |

Nested Loops

- a loop that is inside another loop is called a nested loop

```
for(int i=2; i<=4; i ++)
{       for(int j=1;j<=3; j++)
        {       cout<< i <<" "<<j <<" | ";
        }
        cout<<endl;
}
```

For each iteration of the outer loop, the inner loop will complete all of its iterations. Hence the output of the program would be

Input Validation: Think, Pair, Share

- We are to input an integer number. The number should be greater than equal to 1 and less than equal to 12.

  Write a program and create an input validation loop to ensure that the input integer number is within the range between 1 and 12.