

CSCI 1170

More on repetition structure

- **while loop with post-test (do-while loop)**

Basic syntax:

```
do
{
    statement 1;
    .....
    statement n;
}
while (condition);
```

← loop body, include loop updation

← condition evaluated at the end of one iteration

← “,” at the end

notes: do-while loop will execute at least once

Example 1:

```
cin >> data;
while (data >= 0)
    cin >> data;
```

```
do
{
    cin >> data;
} while (data >= 0);
```

Example 2:

Getting the correct bet amount from user

- **for loop structure**

Basic syntax:

for (initialization; loop condition; updation)
Statement;

// for statement with **compound statements**

for (initialization; loop condition; updation)

```
{
    Statement 1;
    ...
    Statement n;
}
```

Example 3:

```
int count, N=10;
int sum = 0;

for (count=1; count <= N; count++)
    sum = sum + count;
```

```
count=1;
while (count <= N)
{
    sum = sum+count;
    count++;
}
```

Example 4:

```
int sum, odd, N;

cout << "Enter the range value N" << endl;
cin >> N;
for (sum=0, odd = 1; odd <= N; odd = odd+ 2)
    sum += odd;
```

What does this segment of code do?

How many times has the body of the loop statement executed if N=10?

What will be the value of sum after the execution of the code if N=10?

What about odd?

Can you write a while statement to do the same job?

Example 5:

```
cout << "Num      Square \t Root" << endl;
N=5;
for (int num=1; num<N; num++)
{
    square = pow(double (num), 2.0);
    root = sqrt(double (num));

    cout << num << " " << square << "\t" << root << endl;
}
```

Example 6:

```
cout << setw (10) << "Celsius" << setw (15)
    << "Fahrenheit" << endl;

// Print the table.
cout.setf (ios::fixed);
for (celsius = 20; celsius >= -20; celsius -= 5)
{
    fahrenheit = 1.8 * celsius + 32;
    cout << setw (7) << celsius << setw (14)
        << setprecision (2) << fahrenheit << endl;
} // end for
```

Example 6: nested for loop

```
int i, j;
cout << "Char" << setw(10) << "Num" << endl;

for (int i = 0; i < 4; i++)
{
    for (int j = 0; j <= i; j++)
        cout << char(i+65) << setw (10) << j << endl;
}
```

➤ Practice problems:

1. What is the output of the following segment of code?

```
for (i=-5; i<=5; i++);
    cout << i << endl;
```

how about this?

```
for (i=-5; i<=5; i++)
    cout << i << endl;
```

2. Write for loop statement to

- (a) compute n!
- (b) print the first 200 even integers
- (c) compute $\text{sum} = 1*2 + 2*3 + 3*4 + \dots + n*(n+1)$? (the value of n is supplied by the user)
- (d) print the following on screen using for loop: #####
- (e) print the following with nested for loop

\$\$\$

\$\$\$

\$\$\$

\$\$\$

- (f) print the following using nested for loop

*

**

- (h) what is printed by the following code?

```
for ( int count = 1; count <=4; count++)
{
    switch(count)
    {
        case 4: cout << " cow?"; break;
        case 2: cout << " now?"; break;
        case 1: cout << "How"; break;
        case 3: cout << " brown"; break;
    }
}
```

- (e) what is output by the following code?

```
for (int outCount= -1; outCount < 2; outCount++)
{
    for (int inCount = 3; inCount > 0; inCount--)
    {
        cout << outCount + inCount << endl;
    }
}
```

- (f) Convert the following binary number into an integer of base 10:

o 1001001

o 11101

1) cin >> binaryNum; // binaryNum is an integer

int base10=0;

```
for (int exp=0; binaryNum > 0; exp++) {
    modResult = binaryNum%10;
    binaryNum = binaryNum/10;
    base10 = base10 + modResult * pow(2.0, exp);
}
```

2) cin>>binaryNum; // binaryNum as a string

int base10=0;

```
for (int i=binaryNum.length()-1; i>=0; i--)
{
    base10 = base10 + (binaryNum[i]-'0')*pow(2.0, exp);
}
```