

CSCI 1380

MARCH 22, 2017

REVIEW

RANGE FUNCTION

With a partner, complete the following *function*:

```
bool isInRange(double x, double y, double z)
```

such that it returns a *Boolean* value (*true* if the value of *x* is between that of *y* and *z*; *false* otherwise).

WHILE LOOPS

With a partner, complete the following *function*:

```
void printCount(int a, int b)
```

such that it prints the values from a to b in the console.

ITERATION CONT.

WHILE LOOP

The keyword, `while`, cues iterative execution.

```
while ( logical expression )  
{  
    // do some stuff repeatedly, as long as expression evaluates to true  
}
```

ELEMENTS OF A LOOP

- **Initialization:** what are the values of the vars involved before the loop starts?
- **Exit condition:** when/how does the loop quit?
- **Update:** how are the variables changed within the loop?

EXAMPLE

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int input, sum = 0, i = 1;
6      cout << "Enter 3 numbers:";
7      while (i <= 3) {
8          cin >> input;
9          sum = sum + input;
10         i = i + 1;
11     }
12     cout << sum;
13 }
```


INITIALIZATION

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int input, sum = 0, i = 1;
6      cout << "Enter 3 numbers:";
7      while (i <= 3) {
8          cin >> input;
9          sum = sum + input;
10         i = i + 1;
11     }
12     cout << sum;
13 }
```

EXIT CONDITION

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int input, sum = 0, i = 1;
6      cout << "Enter 3 numbers:";
7      while (i <= 3) {
8          cin >> input;
9          sum = sum + input;
10         i = i + 1;
11     }
12     cout << sum;
13 }
```

UPDATE

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int input, sum = 0, i = 1;
6      cout << "Enter 3 numbers:";
7      while (i <= 3) {
8          cin >> input;
9          sum = sum + input;
10         i = i + 1;
11     }
12     cout << sum;
13 }
```

EXERCISE

- Write down the values of **i**, **j** at the beginning of each iteration of the following loop:

```
int i = 0, j = 0;
```

```
while ( i < 5 ) {  
    j = j + 10;  
    ++i;  
}
```

EXERCISE

- With a partner, write a program that:
 - gets **five** integers from the user,
 - computes their **average**,
 - and prints the result to the screen.

USER-CONTROLLED LOOPS

USER-CONTROLLED LOOPS

- Use a **while** loop to do something until a variable (specified by the user) becomes false.
 - Initialization:
 - Declare a **flag** variable.
 - Assign it an initial value (that causes the **while** loop to execute).
 - Condition: check to see if the flag is true (else quit).
 - Update: check with the user about updating the flag variable.

USER-CONTROLLED LOOPS

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      char choice = 'y';
6      while (choice == 'y') {
7          cout << "y is for yay!" << endl;
8          cout << "Do you want to continue looping?";
9          cin >> choice;
10     }
12 }
```


USER-CONTROLLED LOOPS

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      char choice = 'y'; //user-controlled flag
6      while (choice == 'y') {
7          cout << "y is for yay!" << endl;
8          cout << "Do you want to continue looping?";
9          cin >> choice;
10     }
12 }
```

USER-CONTROLLED LOOPS

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      char choice = 'y';
6      while (choice == 'y') {
7          cout << "y is for yay!" << endl;
8          cout << "Do you want to continue looping?";
9          cin >> choice;
10     }
12 }
```

USER-CONTROLLED LOOPS

```
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      char choice = 'y';
6      while (choice == 'y') {
7          cout << "y is for yay!" << endl;
8          cout << "Do you want to continue looping?";
9          cin >> choice; //user's input used to update flag
10     }
12 }
```

EXAMPLE: SUM WHILE TRUE

- How would we write a program that computes a running sum, for as long as the user wants?

SUM WHILE TRUE

```
int main() {
```

```
}
```


SUM WHILE TRUE

```
int main() {  
  
    char choice = 'a';  
  
    int num, sum = 0;  
  
    while (choice != 'q') {  
  
        }  
  
    }
```

SUM WHILE TRUE

```
int main() {  
  
    char choice = 'a';  
  
    int num, sum = 0;  
  
    while (choice != 'q') {  
  
        cout << "Enter a number to sum." << endl;  
  
        cin >> num;  
  
    }  
  
}
```


SUM WHILE TRUE

```
int main() {  
  
    char choice = 'a';  
  
    int num, sum = 0;  
  
    while (choice != 'q') {  
  
        cout << "Enter a number to sum." << endl;  
  
        cin >> num;  
  
        sum += num;  
  
    }  
  
}
```

SUM WHILE TRUE

```
int main() {  
  
    char choice = 'a';  
  
    int num, sum = 0;  
  
    while (choice != 'q') {  
  
        cout << "Enter a number to sum." << endl;  
  
        cin >> num;  
  
        sum += num;  
  
        cout << "Enter any key to continue. Otherwise, enter q to quit.";  
  
        cin >> choice;  
  
    }  
  
}
```

SUM WHILE TRUE

```
int main() {  
  
    char choice = 'a';  
  
    int num, sum = 0;  
  
    while (choice != 'q') {  
  
        cout << "Enter a number to sum." << endl;  
  
        cin >> num;  
  
        sum += num;  
  
        cout << "Enter any key to continue. Otherwise, enter q to quit.";  
  
        cin >> choice;  
  
    }  
  
    cout << sum;  
  
}
```

FOR LOOPS

WHILE LOOP

```
#include <iostream>

using namespace std;
```

```
int main() {
```

```
    int i = 0;
```

initialization

```
    while (i < 3) {
```

loop condition

```
        cout >> i;
```

```
        ++i;
```

update

```
    }
```

```
}
```

FOR LOOP

```
#include <iostream>

using namespace std;
```

```
int main() {
```

```
    for (i = 0, i < 3, ++i) {
```

```
        cout >> i;
```

```
    }
```

```
}
```

WHILE LOOP

```
#include <iostream>

using namespace std;
```

```
int main() {
```

```
    int i = 0;
```

initialization

```
    while (i < 3) {
```

loop condition

```
        cout >> i;
```

```
        ++i;
```

update

```
    }
```

```
}
```

FOR LOOP

```
#include <iostream>

using namespace std;
```

```
int main() {
```

```
    for (i = 0, i < 3, ++i) {
```

```
        cout >> i;
```

```
    }
```

```
}
```

WHILE LOOP

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int i = 0;
```

```
    while (i < 3) {
```

```
        cout >> i;
```

```
        ++i;
```

```
    }
```

```
}
```

FOR LOOP

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    for (i = 0, i < 3, ++i) {
```

```
        cout >> i;
```

```
    }
```

```
}
```