EECS 161
Intro to Programming I

Repetitive Execution
Chap. 2.3
The while loop

for(x=1; x <= 100; x++)
    cout << “hello world” << endl;

VS.

int x=1;
while(x<=100) {
    cout << “hello world” << endl;
    x++;
}
Common Mistakes

```cpp
int x = 1;
while (x <= 100) {
    cout << "hello world" << endl;
    x++;
}
```

What if we forget this?

What if we forget this?
The do/while loop

int x=1;
do {
  cout << "hello world" << endl;
  x++;
} while(x<=100);

• Difference b/w while and do/while?
The for Loop Examples

for(x=-100; x <= 100; x++)
    cout << "hello world" << endl;
for(x=2+2; x <= 17*3; x++)
    cout << "hello world" << endl;
for(x=0; x <= 100; x++)
    cout << "hello world" << endl;
for(x=0; x < 100; x++)
    cout << "hello world" << endl;
for(x=-100; x <= -1; x++)
    cout << "hello world" << endl;
The for Loop Examples

```cpp
for(x=1; x <= 1; x++) {
    cout << "hello world" << endl;
}
for(x=1; x < 1; x++) {
    cout << "hello world" << endl;
}
```

• Why is it better to use curly braces?
The for Loop Pattern

for(<variable> = n; <variable> <= p; <variable>++) {
    <statement>;
    ...
}

for(<variable> = n; <variable> >= p; <variable>--) {
    <statement>;
    ...
}
Nested for Loops

```cpp
for(x = 0; x < 10; x++) {
    for(y = 0; y < 10; y++) {
        cout << "hello world" << endl;
    }
}
```

• How many times is Hello World printed?
Reuse Variables

for(x = 0; x < 10; x++) {
    cout << “The value of x is: ” << x << endl;
}
for(x = 0; x < 10; x++) {
    cout << “The value of x is: ” << x << endl;
}
Variables with same name

```
int x;
for(x = 0; x < 10; x++) {
    for(x = 0; x < 10; x++) {
        cout << “The value of x is: ” << x << endl;
    }
}
```

• What is the output from this nested loop?

The output will be:
```
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
The value of x is: 0
```
Infinite Loops

```cpp
int x;
for(x = 0; x < 10; x++) {
    for(x = 0; x < 5; x++) {
        cout << "The value of x is: " << x << endl;
    }
}
```
Infinite Loops

```cpp
int x, y;
for(x = 0; x < 10; x++) {
  for(y = 0; y < 5; x++) {
    cout << "The value of x is: " << x << endl;
  }
}
```
Infinite Loops

```c++
int x, y;
for(x = 0; x < 10; x++) {
    for(y = 0; x < 5; y++) {
        cout << "The value of x is: " << x << endl;
    }
}
```
Infinite Loops

```cpp
int x;
for(x = 1; x <= 10; x++) {
    cout << "The value of x is: " << --x << endl;
}
```
Why is this good/bad?

```cpp
for(int x = 0; x < 10; x++) {
    for(int y = 0; y < 10; y++) {
        cout << "hello world" << endl;
    }
}
```

- Where can we access x and y?
Looping Recap...

• for loops
  – Repeat for specific number of times
  – Example?

• while loops
  – Repeat while a condition is being met
  – Example?

• do while loops
  – Always do once, and repeat while condition is met
  – Example?