EECS 161
Intro to Programming I

Repetitive Execution
Chap. 2.3
Odds and Ends...

• FYI: Decimal to Float tutorial (never on a test!)

• Assignment #2 posted and due 1/31/14...

• Remember:
  – Study sessions
  – Demo Assignment #1 for a grade
New Operators for Expressions

• What if you have the statement `var = var + 1;`  
  `var += 1; /*Add operand on right to var*/`  
  `var++; /*Increment var by one*/`

• What if you have the statement `var = var - 5;`  
  OR `var = var + var;`  
  `var -= 5;`  
  `var += var;`

• Pre vs. Post increment: `;++var` vs. `var++;`
Multiple Decisions

• What if I want to make these same decisions for the whole year?
  
  If it is sunny today
  then I’ll go to the beach
  if it is windy at the beach
  then I’ll fly a kite
  else if it is not windy at the beach
  then I’ll walk on the shore
  
  Else if it is raining today
  then I’ll stay inside and read a book
  
  Else if it is snowing
  then I’ll go to the mountains to ski

• Repeat the process for 365 days
How do we do this?

• Repetition: for loops
  – Semantics
    • Repeat for a specific # of iterations w/ starting point, ending point, and an increment
  – Syntax
    for(x=1; x <= 365; x++) {
      <statement>;
      <statement>;
      ...
    }
The for Loop

for(x=1; x <= 365; x++) {
<statement>;
<statement>;
...
}

Starting point:
Initialization
The for Loop

for(x=1; x <= 365; x++) {
    <statement>;
    <statement>;
    ...
}

Ending point: Continuation Test
The for Loop

for(x=1; x <= 365; x++) {
    <statement>;
    <statement>;
    ...
}

- What do you notice about order?
The for Loop

for(x=1; x <= 365; x++) {
    <statement>;
    <statement>;
    ...  
}

• Same as x = x + 1
• What about x = x + 2?
The for Loop

for(x=1; x <= 365; x++) {
    <statement>;
    <statement>;
    ...
}

• What do you notice about order?
The for Loop

for(x=1; x <= 365; x++) {
    <statement>;
    <statement>;
    ...
}
Test is False: Execution after loop
The while loop

```
for(x=1; x <= 100; x++)
    cout << "hello world\n";
```

VS.

```
int x=1;
while(x<=100) {
    cout << "hello world\n";
    x++;
}
```
Common Mistakes

```cpp
int x = 1;
while (x <= 100) {
    cout << "hello world\n";
    x++;  // What if we forget this?
}
```

What if we forget this?
The do/while loop

```cpp
int x=1;
do {
    cout << "hello world\n";
    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

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

```c++
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

```cpp
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

```cpp
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?
Reading/Assignments

• Read Chap. 2.3
• Look over Assignment #2...
• Remember the Study Sessions...