CS 161
Intro to CS I

More Decisions/Begin Loops
Finish C++ String Demo

• What does cin do when reading...
  – Int/Floats
  – Strings

• What does getline do?
#include <iostream>
#include <string> // c++ strings

using namespace std;

int main() {
    int x = 20;
    float f;
    string s;

    // cin ignores all leading whitespace,
    // then reads characters of its expected
    // type until it gets to a character not
    // of its type OR whitespace without
    // consuming the char not of its type or whitespace
    cout << "Enter num: 
    cin >> x; // what happens when you enter a non-integer or newline/enter?
    cout << "x is: " << x << endl;

    // can use to see if a cin failed and then clear the failbit and ignore bad
    if (cin.fail()) {
        cin.clear();
        cin.ignore(256, '\n');
    }
}
cin.clear();
cin.ignore(256, '\n');

} 
cout << "Enter float: ";
cin >> f;
cout << "f is: " << f << endl;
cout << "Enter string: ";
cin >> s; //what happens when you enter whitespace before or after?
cout << "s is: " << s << "length: " << s.size() << endl;
cout << "Enter string: ";
//getline reads chars until it gets to a newline and consumes the newline
//without placing it into the string
getline(cin, s); //get rid of pesky newline from the cin before
generate(cin, s); //what happens when you enter whitespace or newline 1st?
cout << "s is: " << s << "length: " << s.size() << endl;

return 0;
} 


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>;
      ...
    }
    get from start to end
The for Loop

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

    ...

}
The for Loop

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

Ending point:
Continuation Test
The for Loop

```java
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

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

Test is False: Execution after loop
Demo...
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?