CS 161
Intro to CS I

Finish Conditionals/Begin Loops

Odds and Ends

- Last week to demo Assignment 1
- Demo Assignment 2, extra slot
- Peer Reviews due Thursday night
- Assignment 3 posted, design due Sunday

- Study sessions
- Class mailer
- Questions?

Reflection

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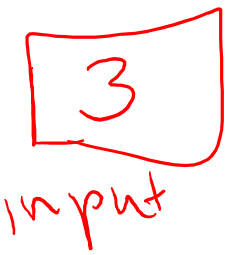
- Tell me what this program does…



2. ENGR

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```
 1 #include <iostream>
 2 #include <climits>
 3
 4 using namespace std;
 5
 6 int main() {
 7    int input;
 8
 9    cout << "Enter an integer: ";
10    cin >> input;
11
12    //produces a description about the number entered by the user
13    if(input%2)
14       cout << "odd integer, ";
15       if(input<(INT_MAX/2))
16          cout << "less than half the largest an int can be!" << endl;
17       else
18          cout << "less than half the largest an int can be!" << endl;
19    else
20       cout << "even integer, ";
21       if(input<(INT_MAX/2))
22          cout << "less than half the largest an int can be!" << endl;
23       else
24          cout << "greater than half the largest an int can be!" << endl;
25
26    return 0;
27 }
                                                        23,10         All
```

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Logical Operators

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- AND
- OR
- NOT

binary

unary

	T	F
!	F	T

Are all logical operators binary?

What is short circuiting?

When might you use it?

and - if 1st operand is False, don't check second operand

OR if 1st operand is True

Demo...

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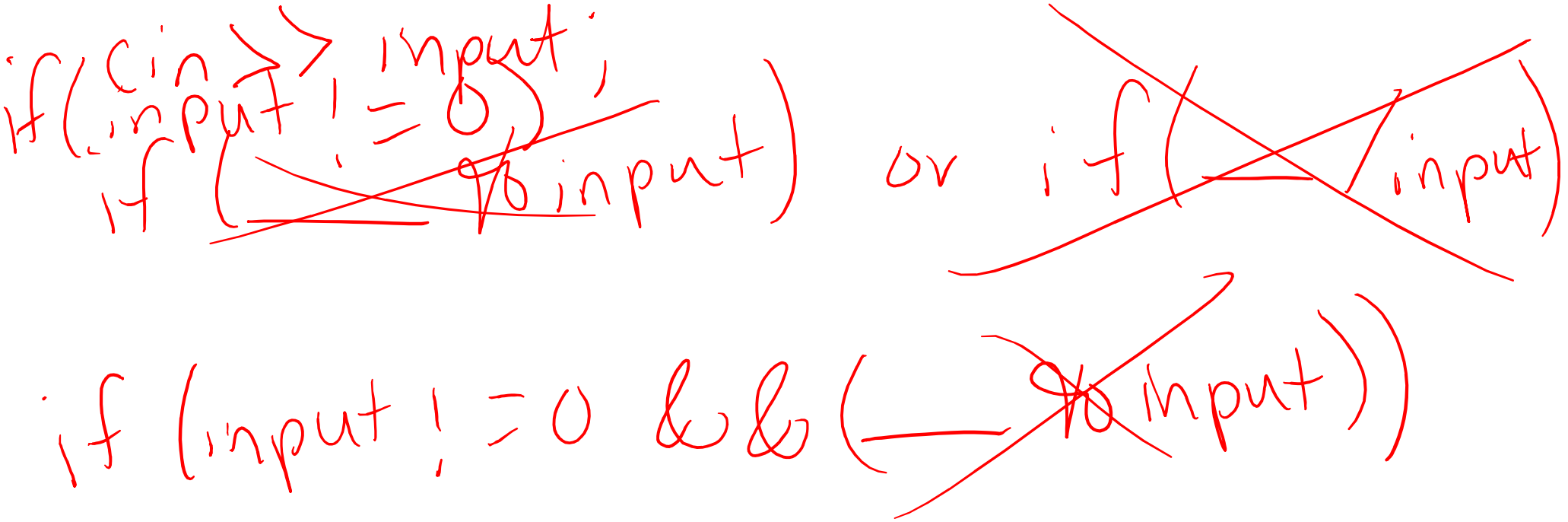

We can use a switch…

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```
switch( <expression> ) {
    case <const-expr>:
        <statement>;
        …
    case <const-expr>:
        <statement>;
        …
     default:
        <statement>;
        …
}
```

C++ Switch Example

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```
switch( x ) {
    case 0:
        std::cout <<"X is zero";
        break;
    case 1:
        std::cout <<"X is one";
        break;
    case 2:
        std::cout <<"X is two";
        break;
    default:
        std::cout <<"You have entered an invalid number!";
}
```

C++ Switch Example

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```
switch( x ) {
    case 0:
    case 1:
        std::cout << "X is zero or one";
        break;
    case 2:
        std::cout << "X is two";
        break;
    default:
        std::cout << "You have entered an invalid number!";
}
```

Multiple Decisions

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- What if I want to make these same decisions for the whole year or while we can still ski?

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
- Repeat the process while I can still ski☺

How do we do this for a year?

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- Repetition: for loops
  - Semantics
    - Repeat for a specific # of iterations w/ starting point, ending point, and a way to get from start to end
  - Syntax

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

How do we do this while we can still ski?

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- Repetition: while loops
  - Semantics
    - Repeat while something continues to hold true
  - Syntax

```
bool can_ski=true;
while(can_ski == true) {
    //go skiing
    cout << "Can you still ski? (0-false, 1-true)" << endl;
    cin >> can_ski;
}
```

The for Loop Pattern

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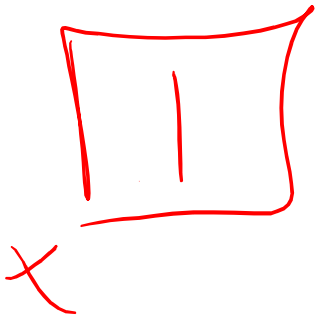
```
for(<variable> = n; <variable> <= p; <variable>++)
   {
        <statement>;
        …
}
for(<variable> = n; <variable> >= p; <variable>--) {
        <statement>;
        …
}
```

The for Loop

Starting point:
Initialization



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

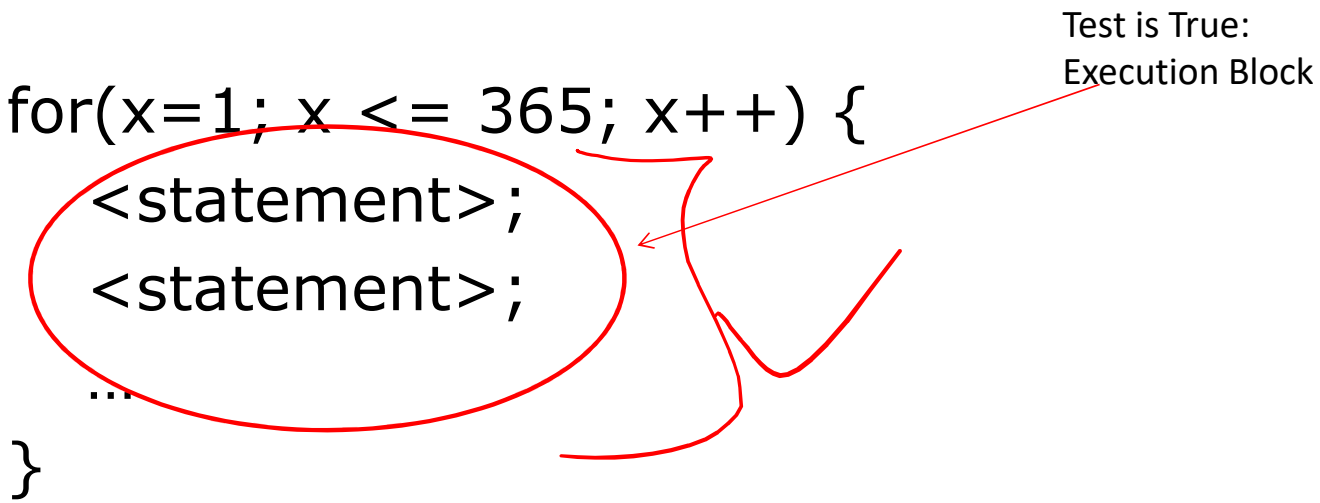
The for Loop

Ending point:
Continuation Test

x = 1

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

The for Loop



- What do you notice about order?

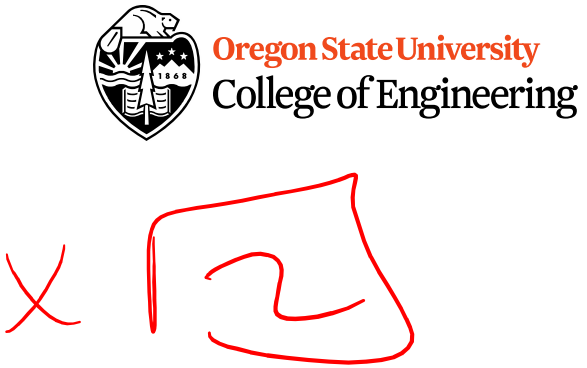
The for Loop

Increment:
Update

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

- Same as x = x+1
- What about x = x + 2?

The for Loop



Ending point:
Continuation Test


```
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 for Loop Examples


```
for(x=0; x <= 100; x++)
    cout << "hello world\n";
for(x=0; x < 100; x++)
    cout << "hello world\n";
for(x=-100; x <= -1; x++)
    cout << "hello world\n";
for(x=-100; x <= 100; x++)
    cout << "hello world\n";
```