

# **CS 161**

## **Intro to CS I**

### Conditions

# Odds and Ends



- Assignment 2 and Back Evals due Sunday
- No school Monday
- Questions?

# Extra Credit Exercise



- Get into groups of 4-5.
- Write your names on a piece of paper.
- How are you adding an element of chance to your Assignment #2?



# Additional Operators

- Common operation: fetch/store same variable

var=var + 2; //increment variable contents

var=var \* 2; //double variable contents

- operator/assignment combination (all ops supported):

var += 2;

var \*= 2;

- Pre/Post increment/decrement: ++ and --

– Example: age++ vs. ++age

*same*

*age++ = 1  
age = age + 1*

*post*

*pre*

3. ENGR

Re-attach Fullscreen Stay on top Duplicate Close

```
1 #include <iostream> //library for input (cin) and output (cout)
2
3 using namespace std;
4
5 int main() {
6     int age=21;
7
8     cout << age++ << endl; //
9     cout << age << endl;
10    cout << ++age << endl;
11    cout << age << endl;
12    age++;
13    cout << age << endl;
14    ++age;
15    cout << age << endl;
16
17
18    return 0;
19 }
```

8,29

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# Decisions in Life



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- What is a decision?
- When do we make decisions?
- How do we make decisions?
  - if it is sunny today
    - then I'll go to the beach and fly a kite
  - 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

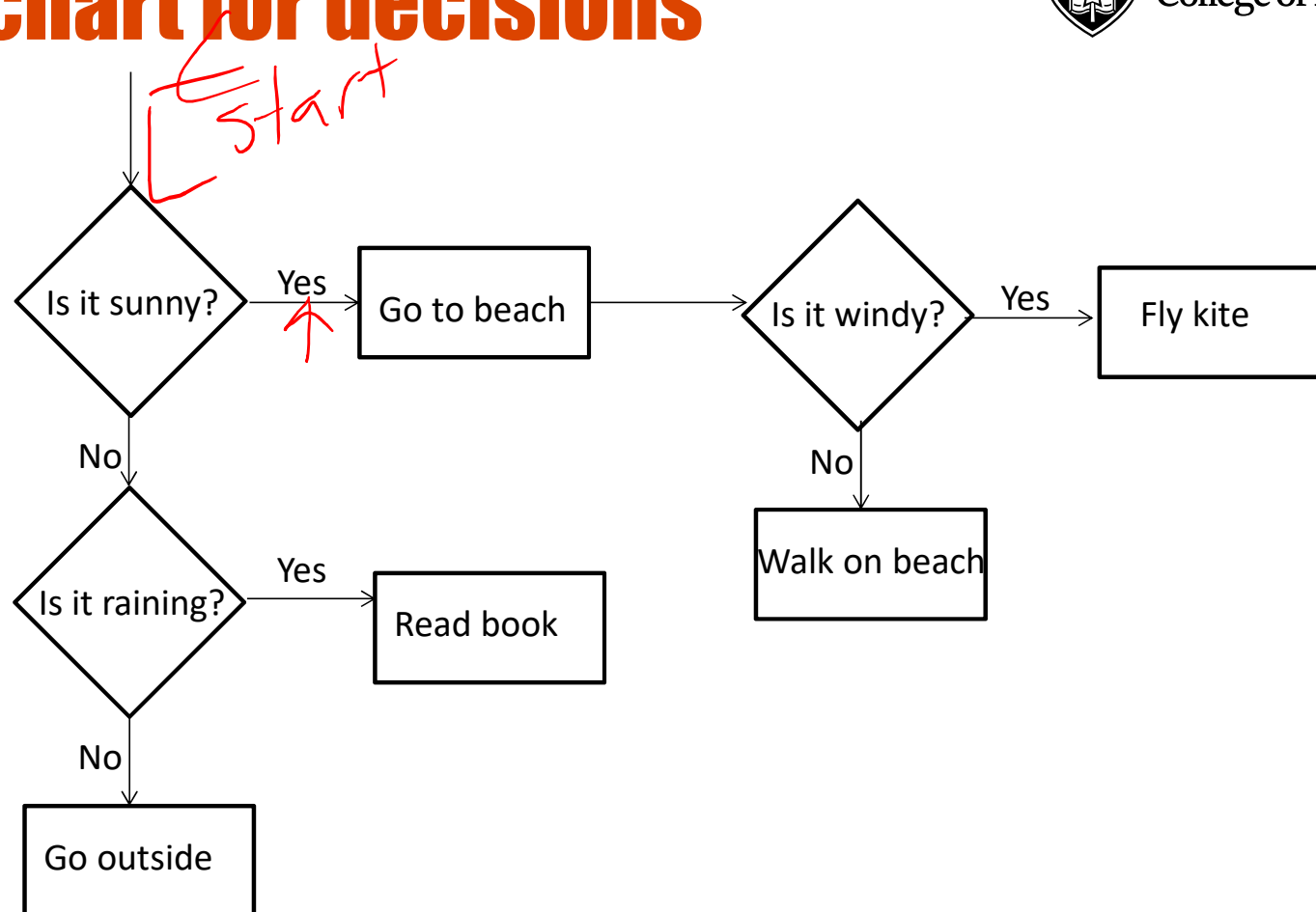
# Decisions within Decisions



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- What happens if there is no wind at the beach?
- How does this change our decisions?
  - 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

# Flow chart for decisions







# Decisions in our programs

- Use an if/else  
if (<expression>) {  
    <statement>;  
    ...  
    <statement>;  
}  
else {  
    <statement>;  
    ...  
}

*if nothing  
is true*

*if(1) - just fine*

*cout << error.mssg.  
<< endl;*



# What is the <expression>?

Could be a relational expression:

<expression> <relational op> <expression>

- Relational Ops

== - equal to

!= - not equal to

< - less than

> - greater than

<= - less than or equal to

>= - greater than or equal to

## C++ If/Else Syntax...

```
int x = 1;  
int y = 1;
```



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```
if( x > y) {  
    std::cout << "X is greater than Y";  
}  
else {  
    std::cout << "X is less than Y";  
}
```

- When does this logic fail?



## C++ If/Else...

```
if( x > y) {  
    std::cout << "X is greater than Y";  
}  
else if( x < y) {  
    std::cout << "X is less than Y";  
}  
else {  
    std::cout << "X is equal to Y";  
}
```

# What are the curly braces for?



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```
if( x > y)
    std::cout << "X is greater than Y";
else if( x < y)
    std::cout << "X is less than Y";
else
    std::cout << "X is equal to Y";
```

# What if we are testing for ==?

```
if( x == 0) {  
    std::cout << "X is zero";  
}  
else if( x == 1) {  
    std::cout << "X is one";  
}  
else if( x == 2) {  
    std::cout << "X is two";  
}  
else {  
    std::cout << "You have entered an invalid number!";  
} exit();
```



*Assignment 2*

Den

```
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Re-attach Fullscreen Stay on top Duplicate Close
1 #include <iostream> //library for input (cin) and output (cout)
2
3 using namespace std;
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5 int main() {
6     int age=21;
7
8     cout << age++ << endl; //
9     cout << age << endl;
10    cout << ++age << endl;
11    cout << age << endl;
12    age++;
13    cout << age << endl;
14    ++age;
15    cout << age << endl;
16
17    if(age==21) { //make sure you don't use an assignment op, =
18        cout << "you can have a beer!" << endl;
19    }
20    else {
21        cout << "wait a few more years!" << endl;
22    }
23    cout << age << endl;
24
25    return 0;
26 }
-- INSERT -- 17,63 All
```

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```
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1 #include <iostream> //library for input (cin) and output (cout)
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5 int main() {
6     int age=21;
7
8     cout << age++ << endl; //
9     cout << age << endl;
10    cout << ++age << endl;
11    cout << age << endl;
12    age++;
13    cout << age << endl;
14    ++age;
15    cout << age << endl;
16
17    if(age>=21) { //better to see if age is 21 or older
18        cout << "you can have a beer!" << endl;
19    }
20    else {
21        cout << "wait a few more years!" << endl;
22    }
23    cout << age << endl;
24
25    return 0;
26 }
-- INSERT -- 17,55 All
```

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# Logical Operators

- AND: `if((1>2) && (2<5))`
- OR: `if((1>2) || (2<5))`
- NOT: `if(!(1>2) && (2<5))`

- Precedence of Operators:

[http://en.cppreference.com/w/cpp/language/operator\\_precedence](http://en.cppreference.com/w/cpp/language/operator_precedence)

Handwritten notes and truth tables illustrating logical operators and short-circuit evaluation:

**And**

T	T	T	T	T
T	F	F	F	F
F	T	T	T	T
F	F	F	F	F

Annotations: "short-circuit" (circled 'F' in first column), "not evaluated" (crossed out 'T' in second column).

**OR**

T	T	T	T	T
T	F	T	T	T
F	T	T	T	T
F	F	F	F	F

Annotations: "short-circuit" (circled 'T' in first column), "not evaluated" (crossed out 'T' in second column).

**NOT**

T	F	T	F	T
F	T	F	T	F
T	T	F	T	F
F	F	T	F	T

Annotations: "short-circuit" (circled 'T' in first column), "not evaluated" (crossed out 'T' in second column).

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