Review

Ch 1-5

99 little bugs in the code.
99 little bugs in the code.
Take one down, patch it around.

127 little bugs in the code...

Executing code

Compile code

(convert from C++ to computer code)

- Syntax errors will prevent compilation

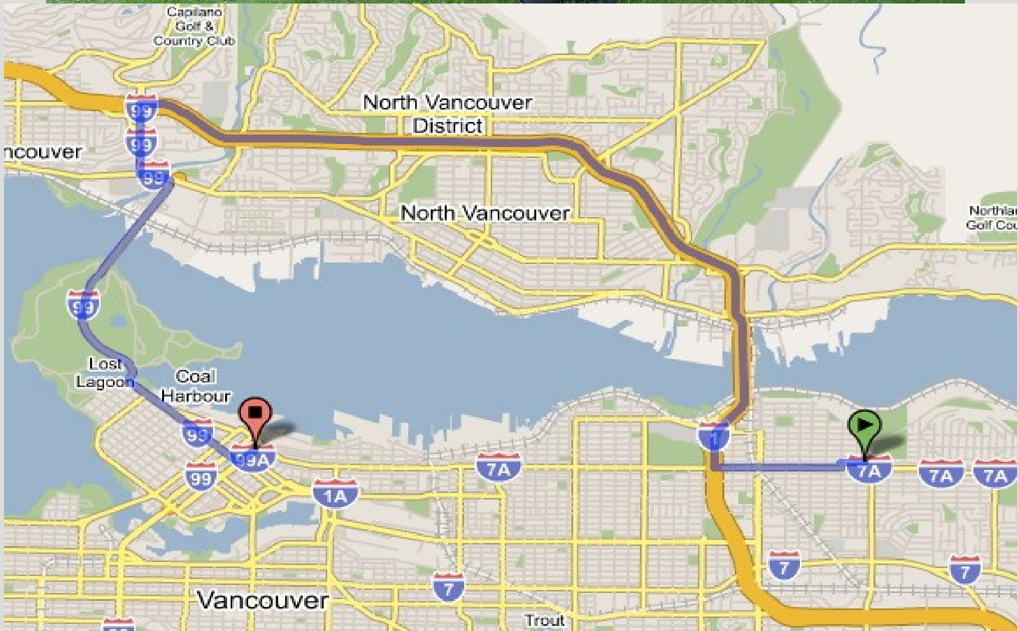
Run code

- Runtime errors will crash your program
- Logic errors will make your program give the wrong output

Syntax =
car won't start

Runtime =
car accident

Logic =
bad directions



Identifiers

The identifier is the name of a variable/method

- Case sensitive
- Must use only letters, numbers or _
- Cannot start with a number
- (Some reserved identifiers)

Examples (second word):

```
int x, String s_o_s, double high2low
```

Primitive Types

bool - True or false

char - (character) A letter or number

int - (integer) Whole numbers

long - (long integers) Larger whole numbers

float - Decimal numbers

double - Larger decimal numbers

doubles are approximations

ints are exact but have a more limited range

cin

cin >> x;

By default, this will read the based off the type of x, until it finds a space or character not the same type as x

getline(cin, x);

x needs to be a string, but then stores everything up until you hit enter

Note: mixing getline and “cin >>” ends poorly

Operations

Order of precedence (higher operations first):
-, +, ++, -- and ! (unary operators)
*, / and % (binary operators)
+ and - (binary operators)

Operators that change variables:
++, --, +=, -=, *=, /=, =

Note: integer division happens if you divide two ints: int / int = int

If statements

```
if (boolean expression) {
   // code
}
else {
   // more code
}
```

|| is the OR operations

&& is the AND operations

Logical operations:

> (greater than)

== (equals)

< (less than)

>= (greater than
      or equal to)

!= (not equal to)

<= (less than
      or equal to)

Short-circuit evaluation

Simple cases of short-circuit:

When you have a bunch of ORs

```
if( expression || exp || exp || exp )
```

Once it finds any true expression, if statement will be true

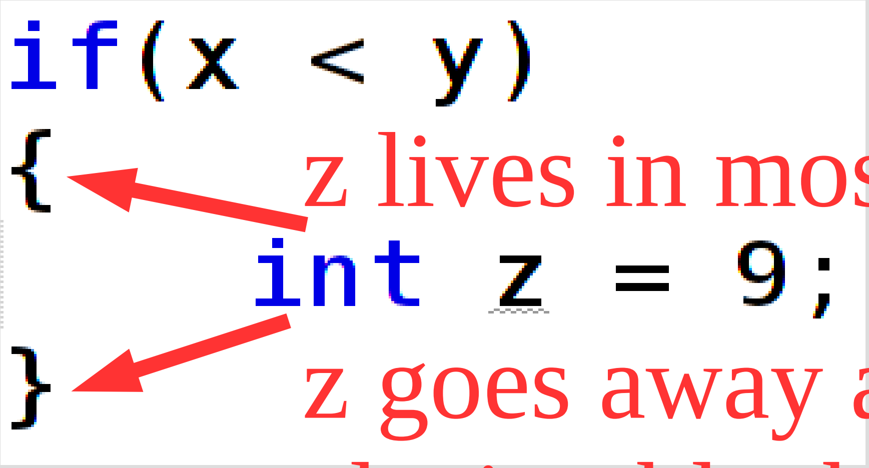
When you have a bunch of ANDs

```
if( expression && exp && exp && exp )
```

Once it finds any false expression, if statement will be false

Scope

Variables only exist in the most recently started block:



```
if(x < y)
{
        int z = 9;
}
```

z lives in most recent block

z goes away at corresponding closing block

If you want variables to exist longer, you need to declare them further up in the program

Loops

3 parts to any (good) loop:

- Loop variable initialized
- boolean expression with loop variable
- Loop variable updated inside loop

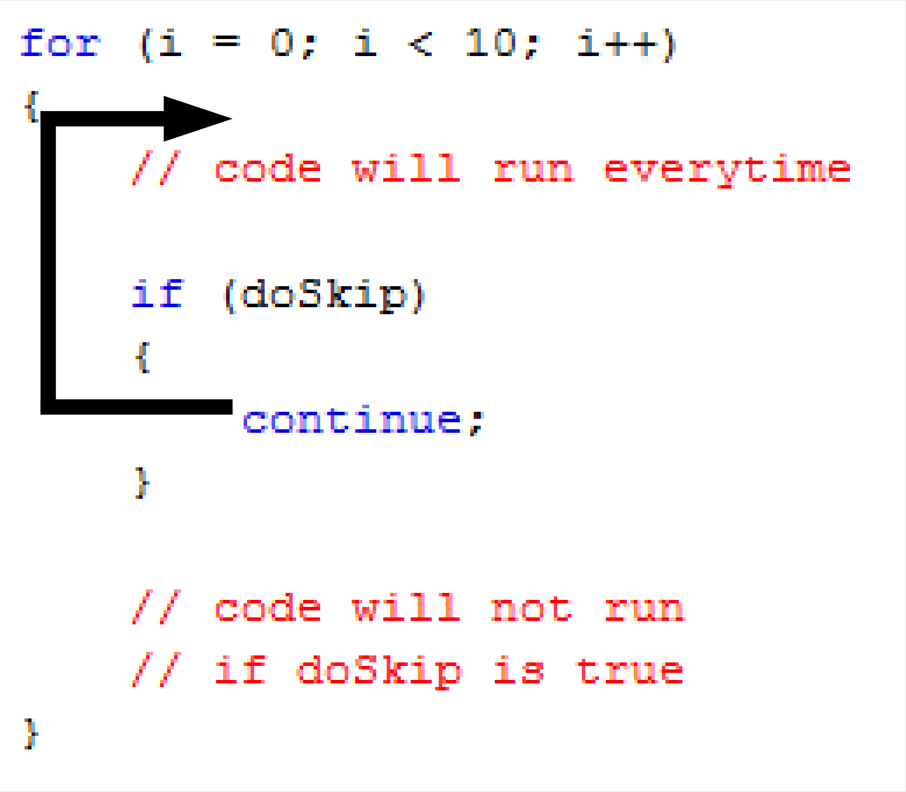
for loops have these 3 parts in the same place

while loops have these spread out

do while loops are while loops that always execute at least once

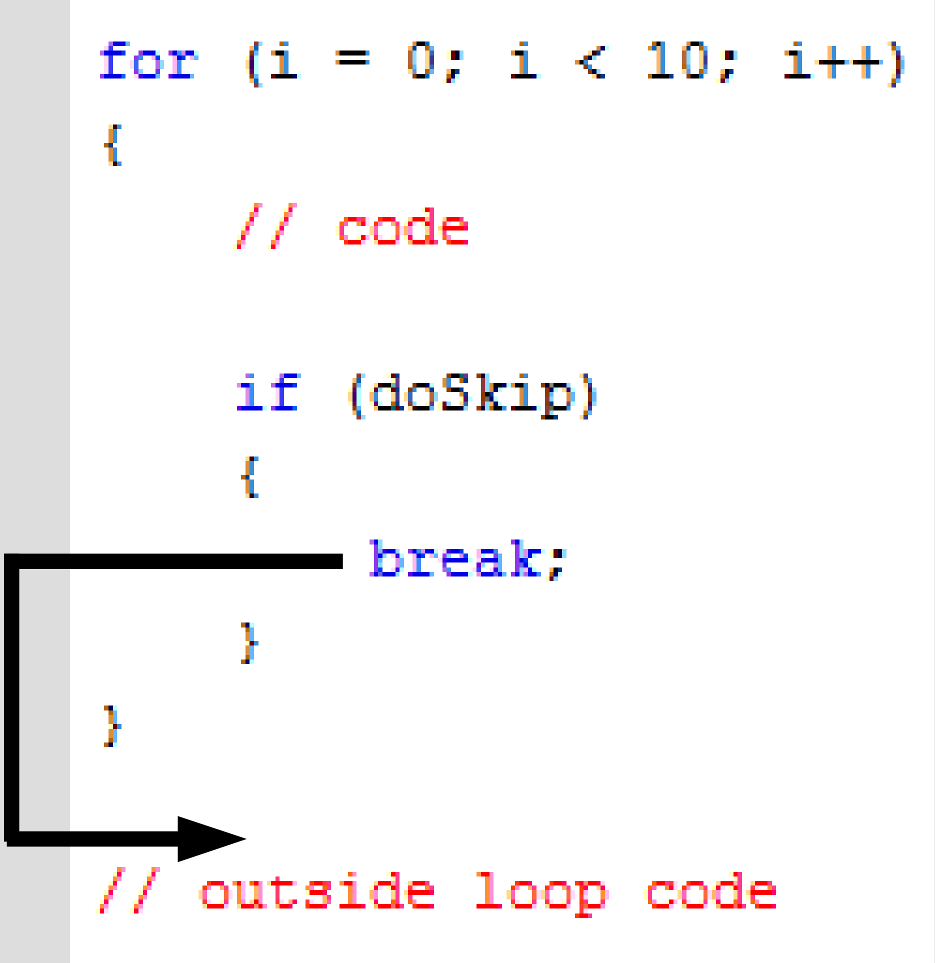
Looping control commands

<u>continue</u> restarts loop immediately



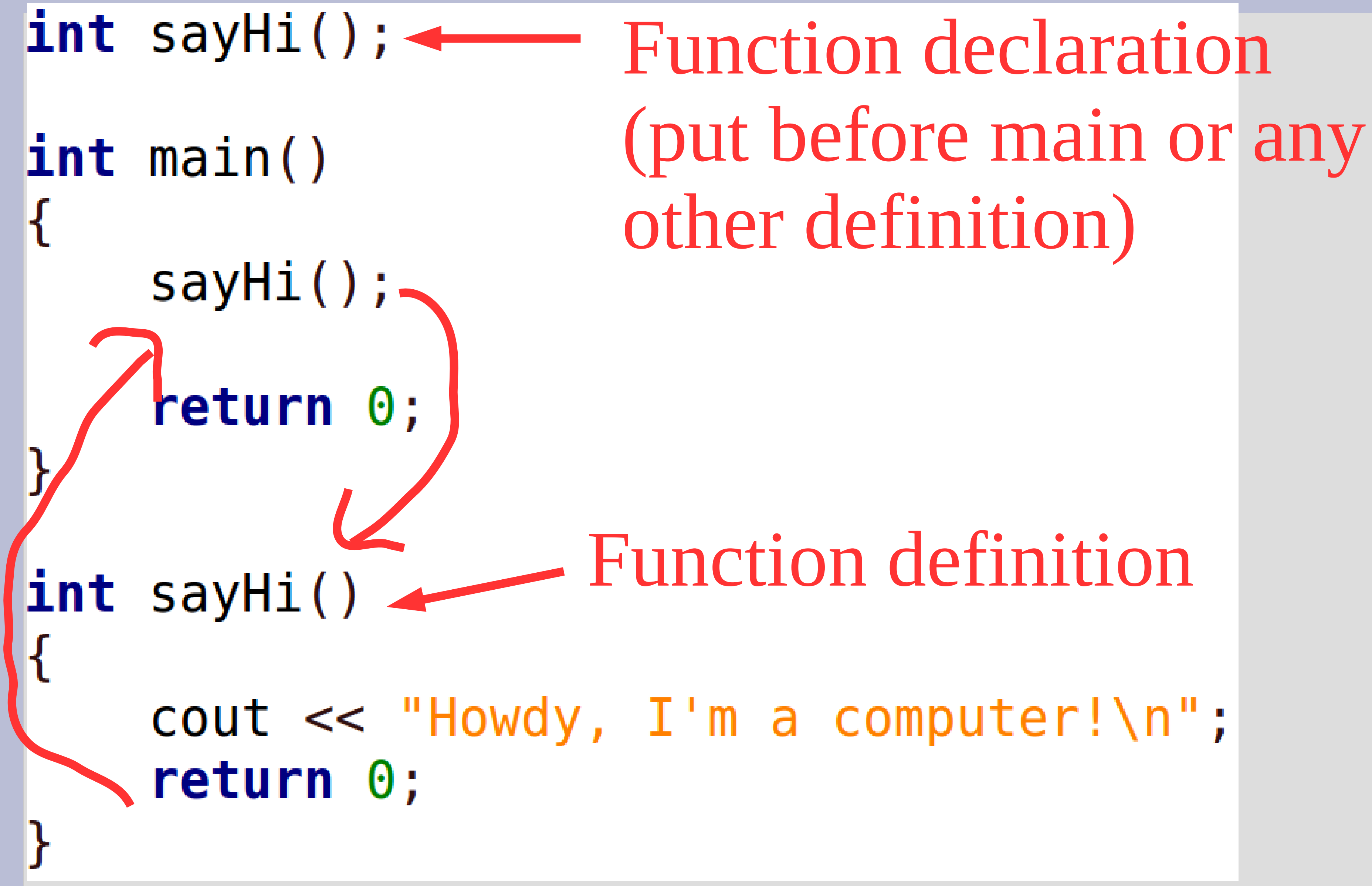
```
for (i = 0; i < 10; i++)
{
    // code will run everytime

    if (doSkip)
    {
        continue;
    }

    // code will not run
    // if doSkip is true
}
```

<u>break</u> stops loop



```
for (i = 0; i < 10; i++)
{
    // code

    if (doSkip)
    {
        break;
    }
}

// outside loop code
```

Functions

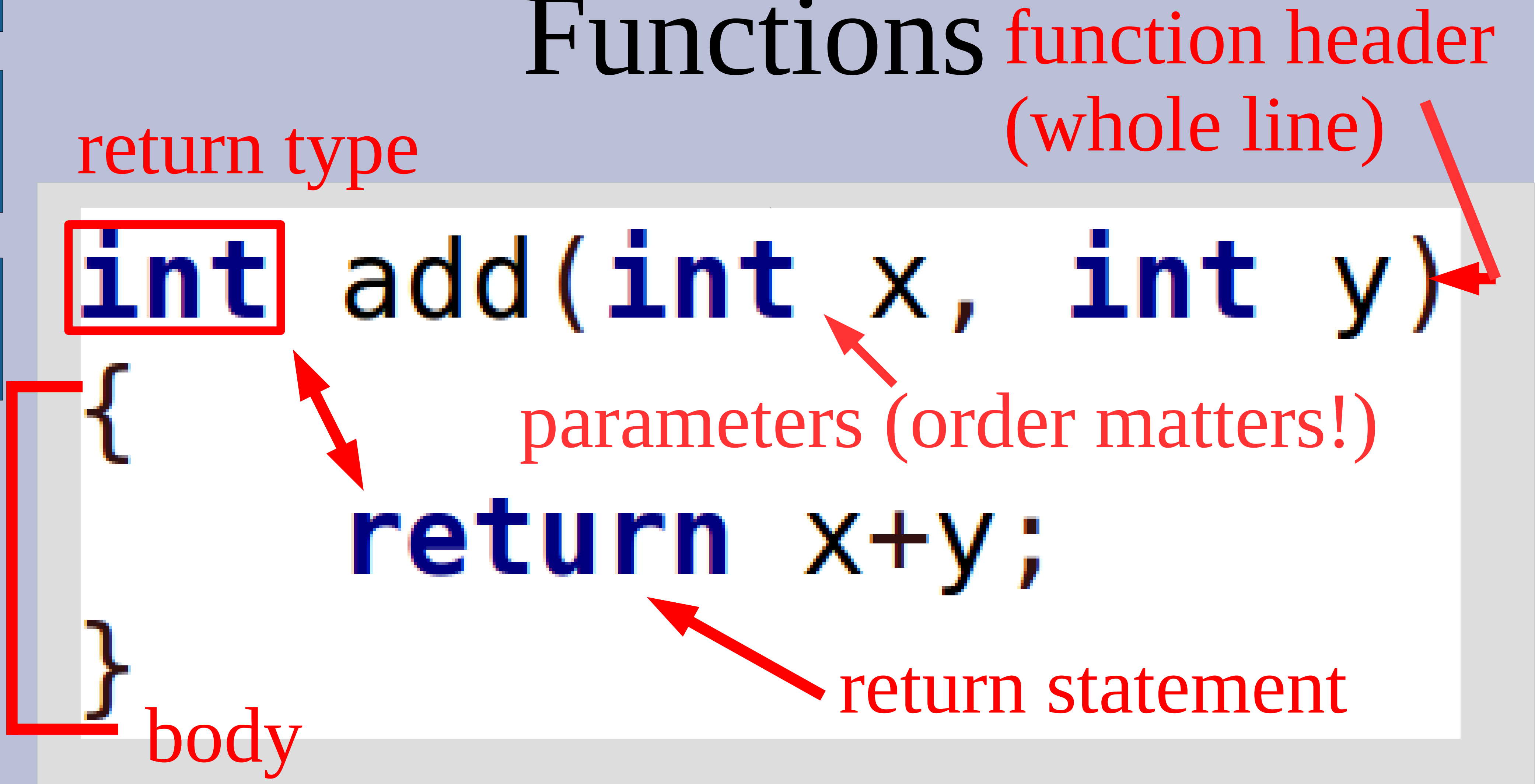


```
int sayHi();

int main()
{
    sayHi();

    return 0;
}

int sayHi()
{
    cout << "Howdy, I'm a computer!\n";
    return 0;
}
```

Function declaration (put before main or any other definition)

Function definition

Functions



```
int add(int x, int y)
{
        return x+y;
}
```

function header (whole line)

return type

parameters (order matters!)

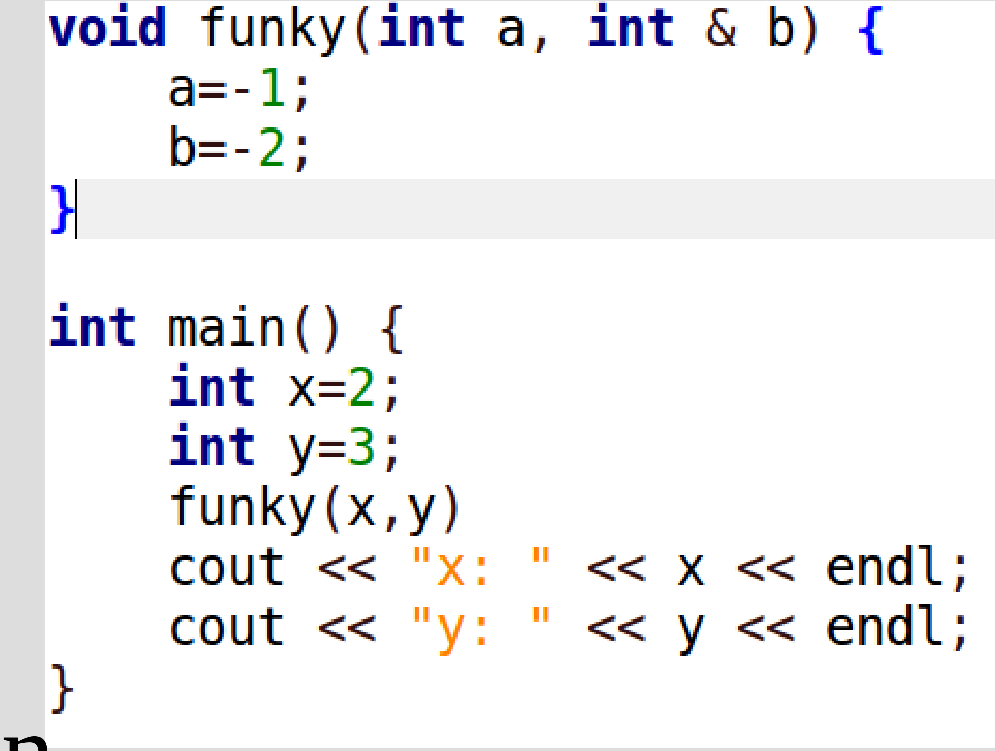
return statement

body

The return statement value must be the same as the return type (or convertible)

Functions

The “default” way when passing in variables to functions is to copy the value



```
void funky(int a, int & b) {
    a=-1;
    b=-2;
}

int main() {
    int x=2;
    int y=3;
    funky(x,y)
    cout << "x: " << x << endl;
    cout << "y: " << y << endl;
}
```

This makes a local variable in the function

The “call-by-reference” way actually passes the variable into the function (i.e. memory address)