Computer Programming Fundamentals

CS 152
Professor: Leah Buechley
TAs: Melody Horn, Noah Garcia, Andrew Geyko, Juan Ormaza
Time: MWF 10:00-10:50am
https://handandmachine.cs.unm.edu/classes/CS152_Fall2021/

MIDTERM TODAY

- 3 hours to complete exam
- 24 hour window
- 11am Wednesday - 11am Thursday
- 10% of final grade

EXAM TOPICS OVERVIEW

- Programming process: write, compile execute
- Variables
- Type
- Conditionals: if, else statements
- Boolean operations
- Loops: while and for
- Methods
- CS coordinate system
- Generating random numbers
- Arrays, 1D and 2D
- Classes and Objects

NOT ON THE EXAM

- static
- MyFrame, MyPanel, and Screen details
- keyboard interaction using KeyListener
- getting input using scanner
- import class names and details

questions?

GRADING POLICY UPDATE:
WILL DROP LOWEST ASSIGNMENT/ QUIZ GRADE FROM AVERAGE

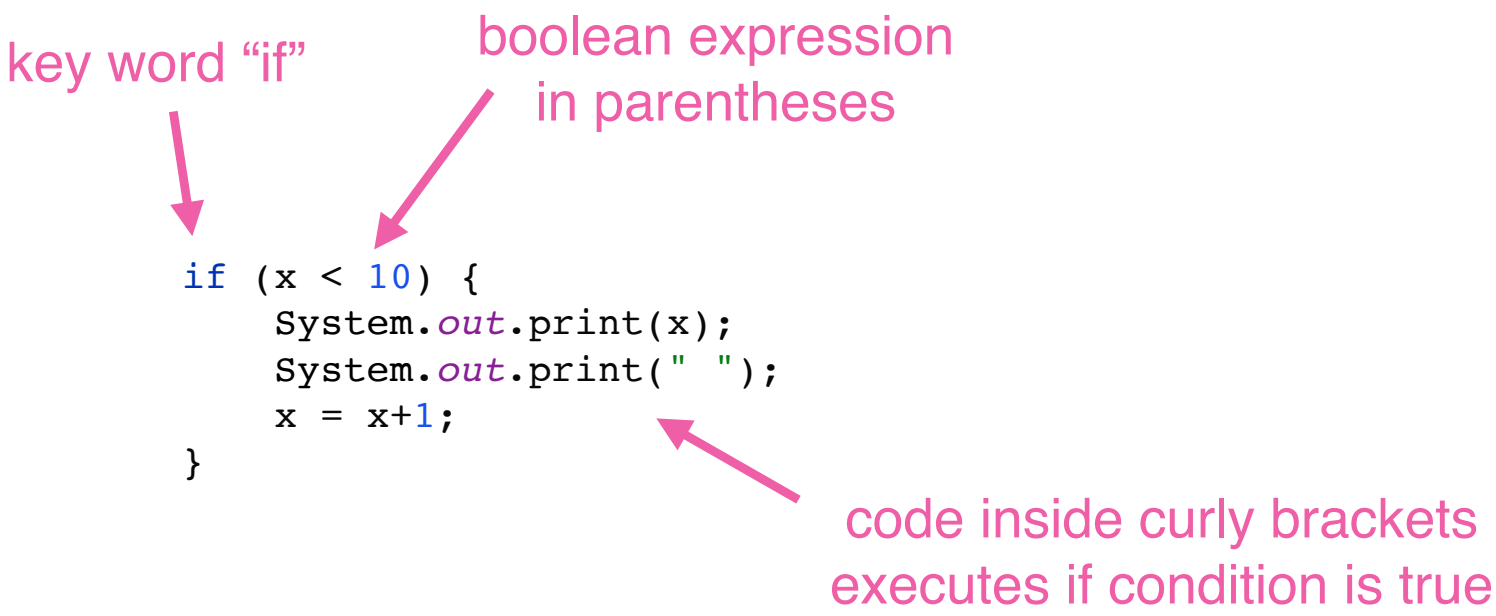
APPLIES ONLY TO ASSIGNMENTS & QUIZZES UP TO TODAY

WILL GIVE YOU GRADE SO FAR AFTER MIDTERM

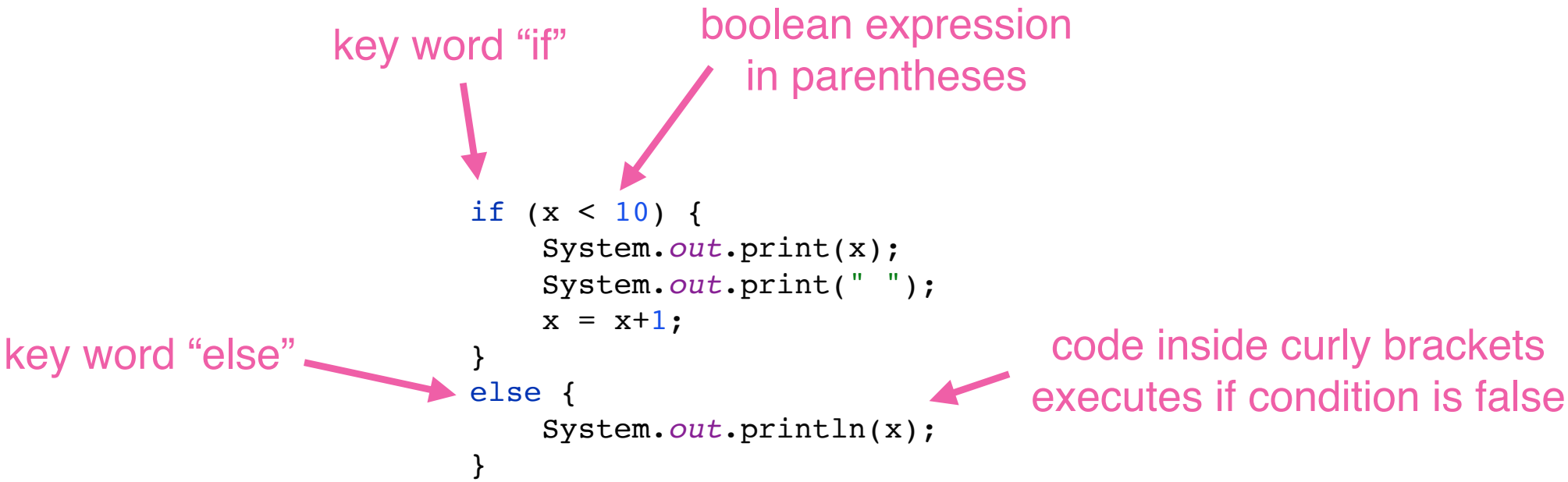
questions?

CONDITIONALS

IF STATEMENT



IF ELSE STATEMENT



BOOLEAN EXPRESSIONS

- A question with an answer that is either TRUE or FALSE
- A logical statement that is either TRUE or FALSE
- Examples:

```
y != 4000
```

Is y not equal to 4000?

```
x <= 50
```

Is x less than or equal to 50?

```
a == 10.5
```

Is a equal to 10.5?

RELATIONAL OPERATORS

- Relational operators ask about the relationships between things. They ask our questions. They are:

==	equal to	x == 10	is x equal to 10?
!=	NOT equal to	x != 10	is x not equal to 10?
<	less than	x < 10	is x less than 10?
<=	less than or equal to	x <= 10	is x less than or equal to 10?
>	greater than	x > 10	is x greater than 10?
>=	greater than or equal to	x>=10	is x greater than or equal to 10?

BOOLEAN EXPRESSIONS

- Create more complex expressions by combining them with AND and OR
  - » AND && combines 2 statements, TRUE if both are TRUE
  - » OR || combines 2 statements, TRUE if either is TRUE
- Examples
  - » mouseY < 250 && mouseX < 250
    (is mouseY less than 250 and mouseX less than 100?)
  - » x==0 || x==5
    (is x equal to 0 or 5?)
  - » (mouseY < 250 && mouseX < 250) || (x != 7)

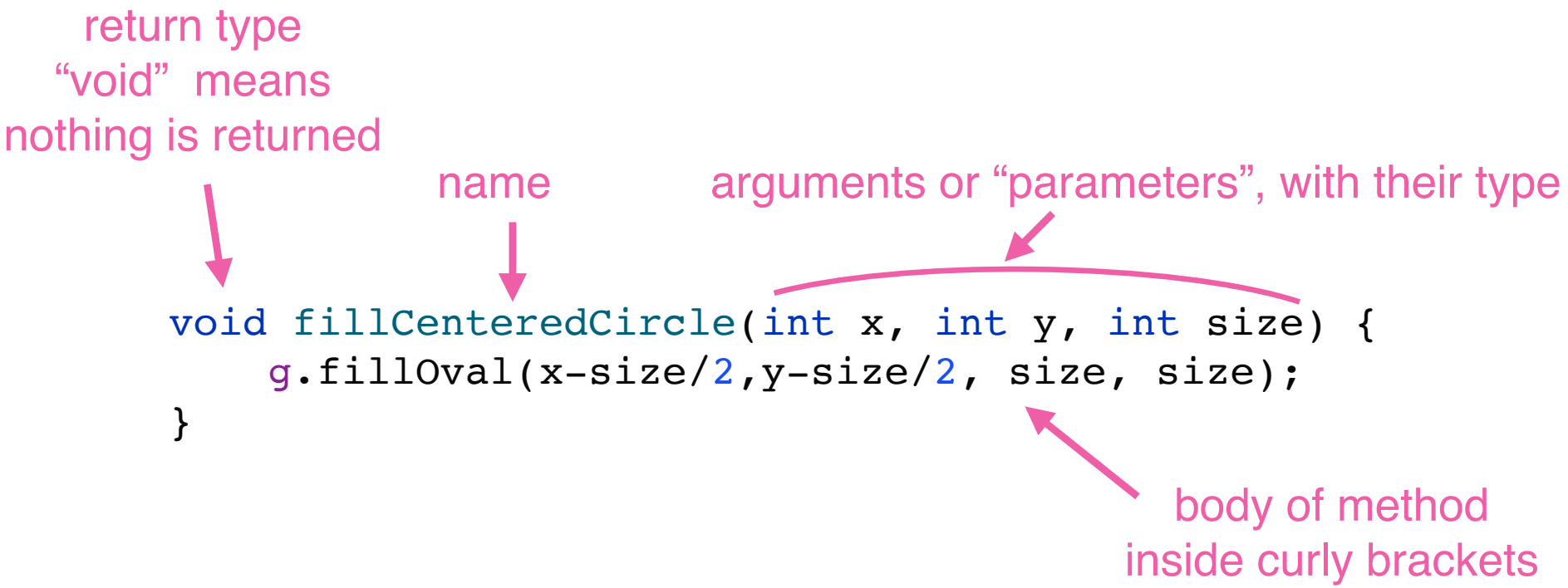
questions?

METHODS

WHAT ARE METHODS?

- A chunk of code that you give a name to.
- You “call” a function by writing it’s name in your program
- When your program encounters the name, it jumps to the function and executes it.
- When finished, the program “returns” to where it was when the function was called.

DECLARING A METHOD



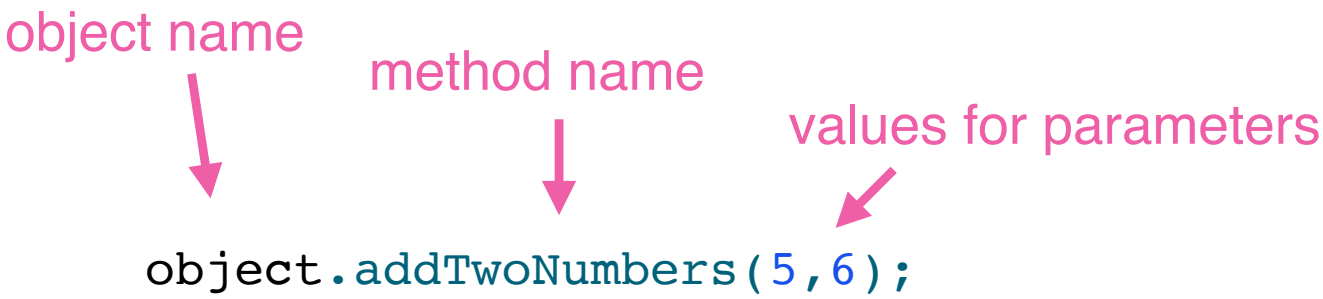
A METHOD THAT RETURNS A VALUE

return type

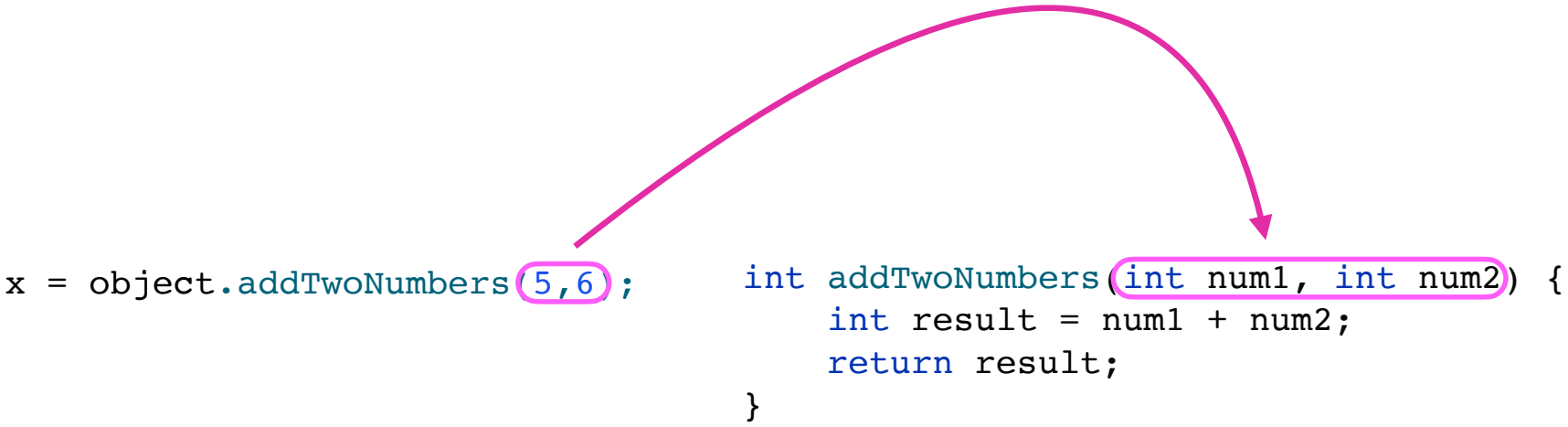
```
int addTwoNumbers(int num1, int num2) {
    int result = num1 + num2;
    return result;
}
```

return statement
must be present
its type must match return type

CALLING A METHOD



WHEN THE CODE EXECUTES



values of 5 and 6 are passed to the method

WHEN THE CODE EXECUTES

```
x = object.addTwoNumbers(5,6);
```

```
int addTwoNumbers(int num1, int num2) {
    int result = 5 + 6;
    return result;
}
```

values of 5 and 6 are substituted for num1 and num2

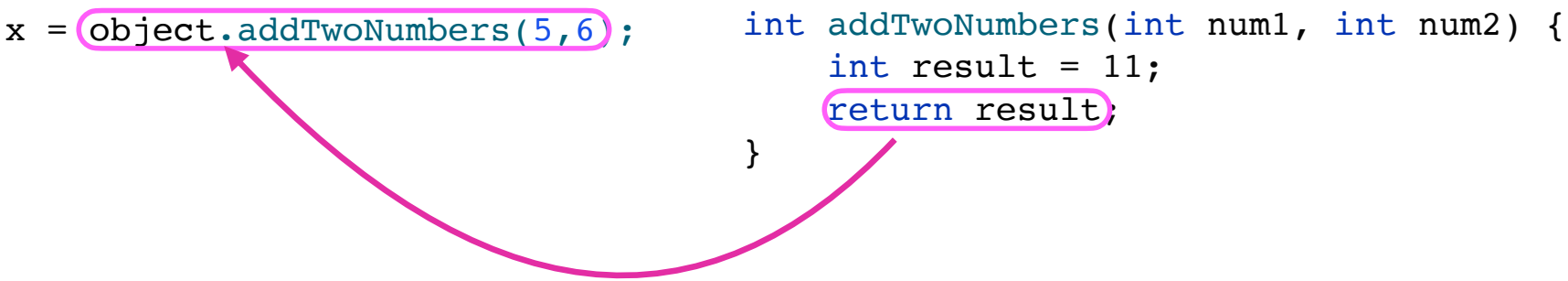
WHEN THE CODE EXECUTES

```
x = object.addTwoNumbers(5,6);
```

```
int addTwoNumbers(int num1, int num2) {
    int result = 11;
    return result;
}
```

code in method is executed with the substituted values

WHEN THE CODE EXECUTES



result is passed back to location where method was called

WHEN THE CODE EXECUTES

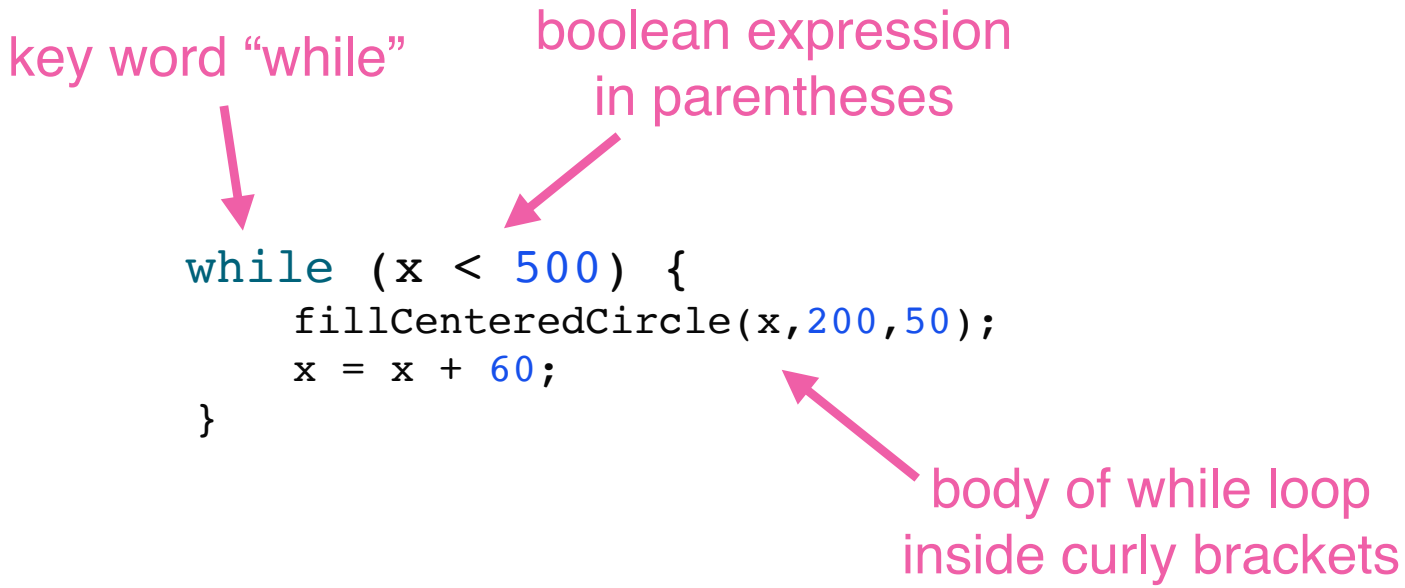
```
x = 11;
```

```
int addTwoNumbers(int num1, int num2) {
    int result = 11;
    return result;
}
```

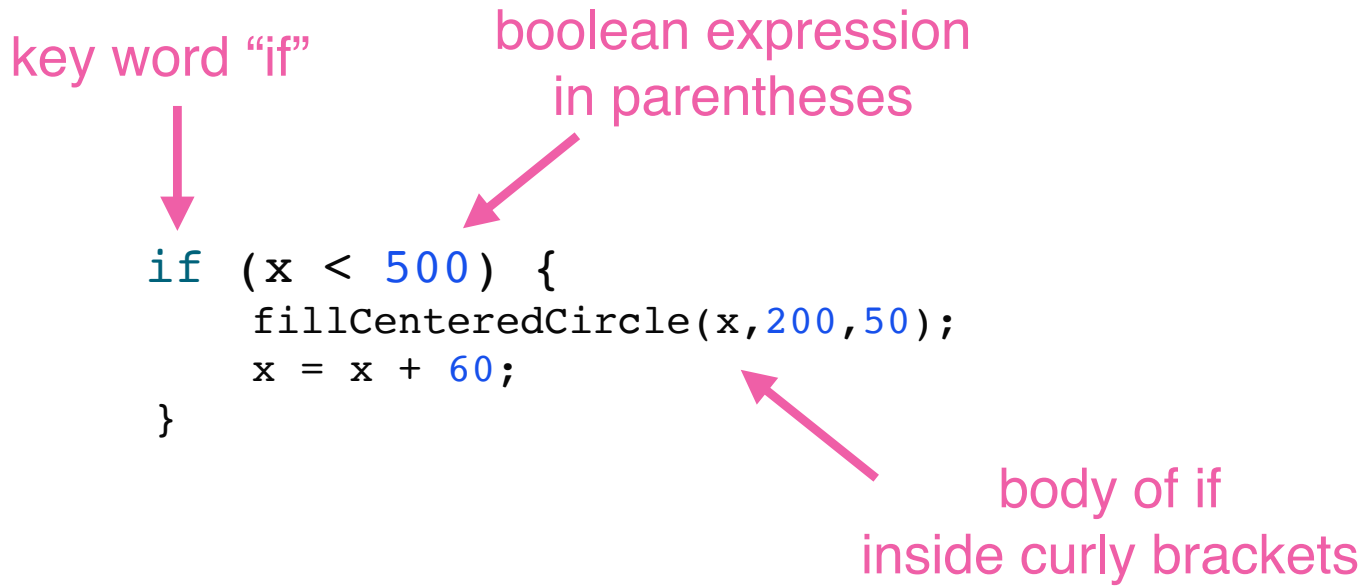
questions?

WHILE LOOPS

STRUCTURE of WHILE LOOP in JAVA



SIMILAR TO IF



HOW A WHILE LOOP WORKS

while the boolean expression is true

```
while (x < 500) {
    fillCenteredCircle(x,200,50);
    x = x + 60;
}
```

these statements will be executed

FOR LOOPS

STRUCTURE of FOR LOOP in JAVA

key word “for”

(declare variable; test variable; change variable)

```
for (int i = 0; i<10; i=i+1) {
    System.out.print(i);
    System.out.print(" ");
}
```

body of for loop
inside curly brackets

WHILE vs FOR

```
int i = 0;
while (i < 10) {
    System.out.print(i);
    System.out.print(" ");
    i = i+1;
}
```

```
for (int i = 0; i<10; i=i+1) {
    System.out.print(i);
    System.out.print(" ");
}
```

questions?

CS COORDINATE SYSTEM

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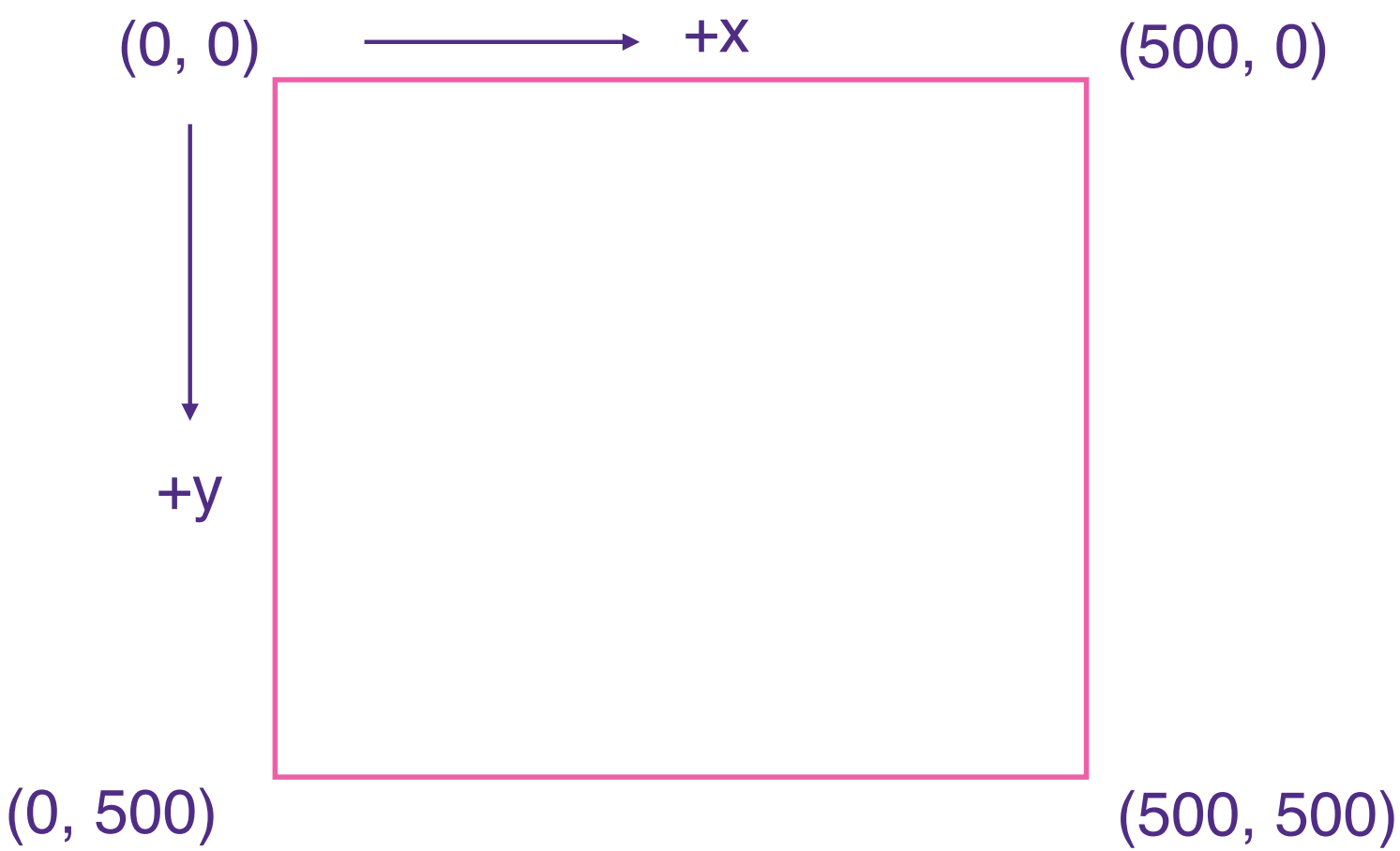
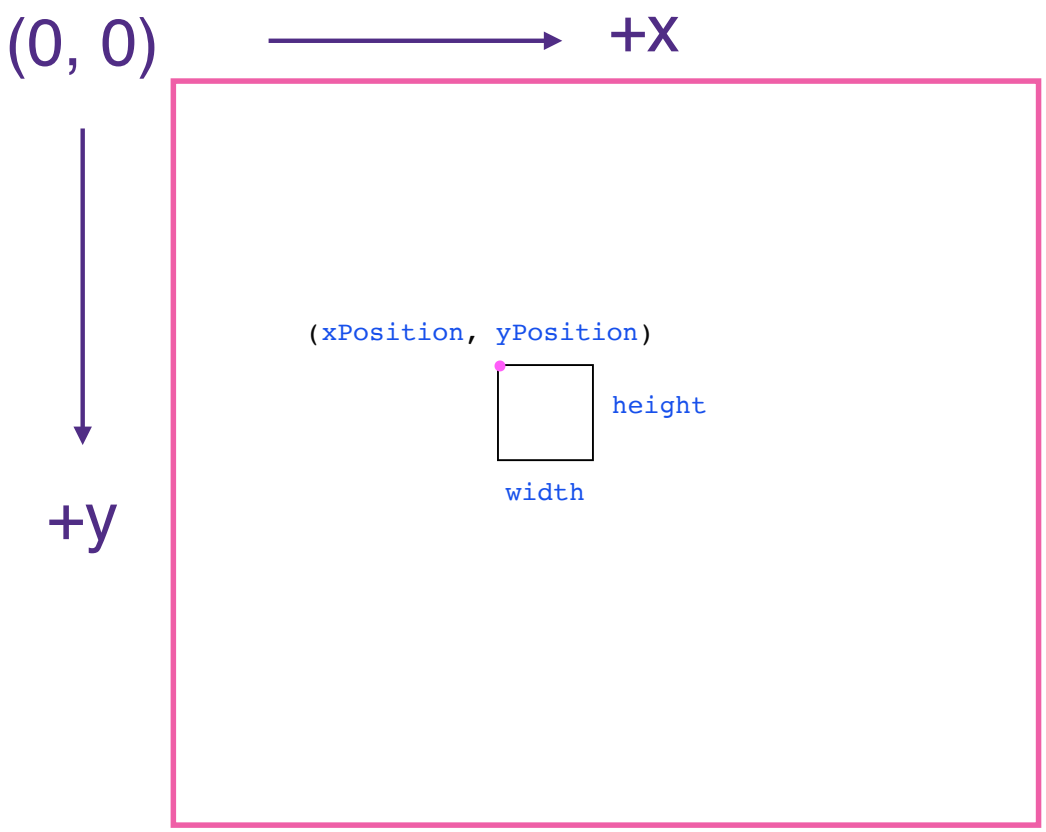


CS COORDINATE SYSTEM




```
g.drawRect(xPosition, yPosition, width, height);
```

RANDOM NUMBERS

RANDOM NUMBERS

```
Math.random()
```

numbers between? type?

```
(int)(Math.random()*100);
```

numbers between? type?

Thank you!

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