CSE 11
Accelerated Intro to Programming
Discussion Section 6

Sachin Deshpande

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This discussion is being recorded

Logistics

- PA6 Released, due Sunday

- PA7 released early – start early!

- Exam this week – see Piazza for details

For-in loops ~ For-each loops

- **run the body of their loops once per element in a given array**
- **follows the order that they appear in the array, with the "loop variable" assigned to that element**
- **Their syntax looks like:**

```
for (/* element type */ /* variable name */: /* array */) {

    /* loop body */

}
```

Example :

```
String[] messages = {"Hello", "CSE11"};


for (String message: messages) {

    System.out.println(message);


}
```

for each String message in the array messages

prints

```
Hello

CSE11
```

Counted for loops

More powerful than for-in loops

- **More fine grained control compared to for-in loops - these are not limited to running once per element in an array**
- **Their syntax looks like:**

→ initialize a variable

→ updating the variable

```
for (/* initializer */; /* condition */; /* update */) {
    /* body */
}
```

must evaluate to a boolean

```
int[] arr = {1, 2, 3};
for (int ele : arr) {
    ele = 2;  ✗
}
```

```
for (int i = 0;
     i < arr.length;
     i += 1) {
    arr[i] += 1;
}
```

```
---------------------------------------------------------
|                                                       |
|                                                       |
|                                                  v    |
-------------        ------------        --------        ----------   |
|  initializer  | -> |  condition  | ------->| body | -> |  update  | -
-------------        ------------   true  --------        ----------
                          |
                    false |
                          |
                          v
                       (exit)
```
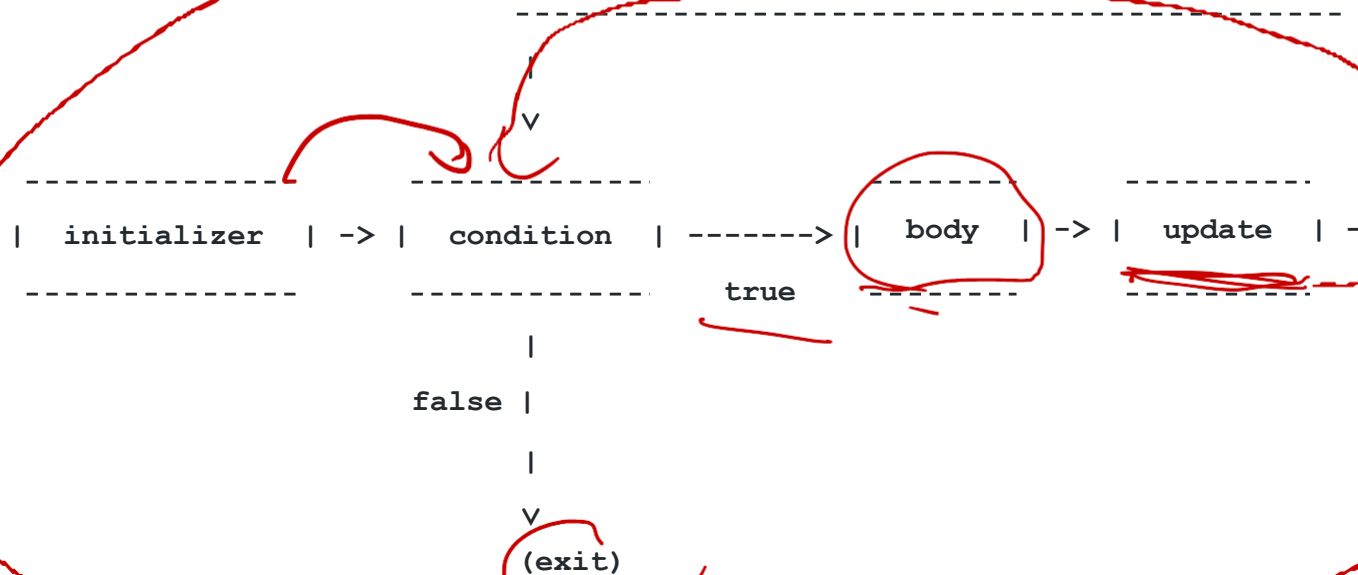
Counted for loops

- body of counted for loops contain other can contain multiple Java statements, including multiple method calls, variable definitions and updates, if statements, and even other loops

Nested for-loops (handwritten)

// Start with the top header of the table

```
String result = "\t1\t2\t3\t4\t5\n";

for (int i = 1; i <= 5; i += 1) {
    // Print the left header
    result += i;

    // Print the row
    for (int j = 1; j <= 5; j += 1) {
        result += "\t" + (i * j);
    }

    //Add a newline to finish the row
    result += "\n";
}

System.out.println(result);
```

Prints the times table from 1 to 5 to the terminal:

(handwritten annotations: j →)

	1	2	3	4	5
i = 1	1	1	2	3	4	5
i = 2	2	2	4	6	8	10
i = 3	3	3	6	9	12	15
i = 4	4	4	8	12	16	20
i = 5	5	5	10	15	20	25

Loop Basics

- How to access elements in a very very long array?
- Loops
    - For-loop

init statement

terminating condition

update step

```
for (int i = 0; i < arr.length; i++){
    System.out.println(arr[i]);
}
```

loop body

  - For-each loop

```
for (int element : arr){
    System.out.println(element);
}
```

for each element in arr

  - While loop

condition

```
int i = 0;
while (i < arr.length){
    System.out.println(arr[i]);
    i++;
}
```
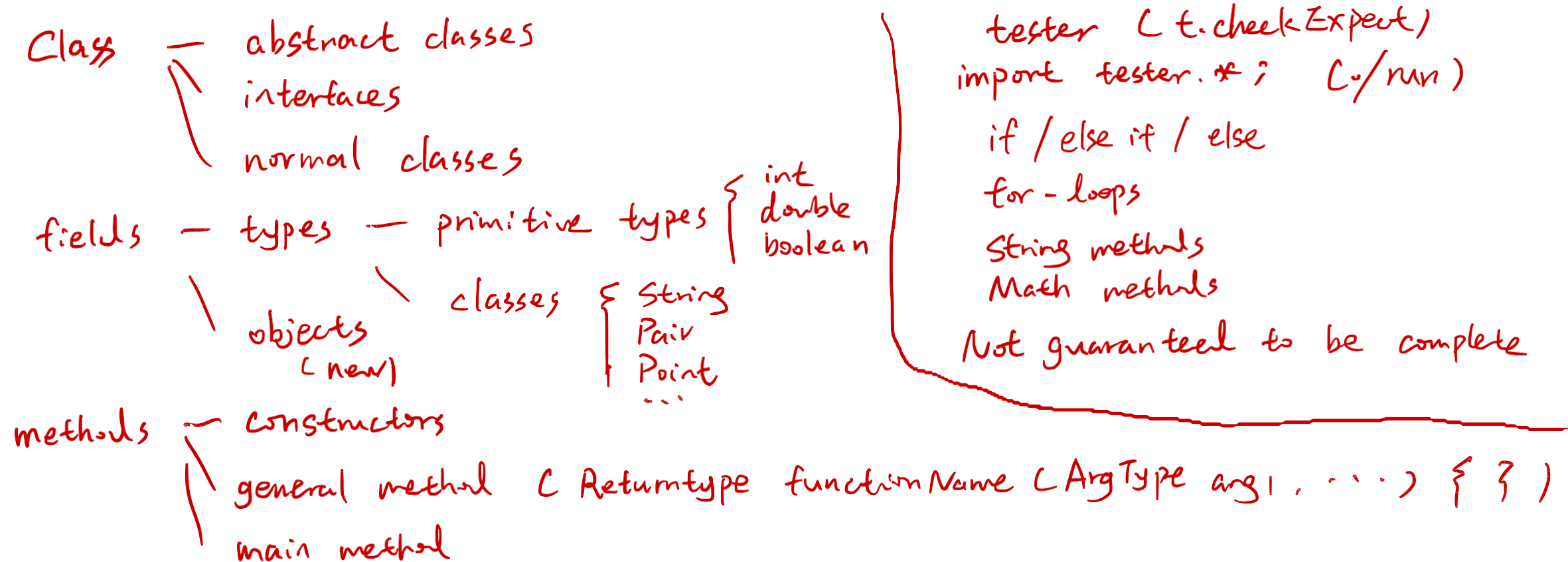
Exam

Reserve enough time

Programming assignment: Coding + Video

Materials: Review lectures / readings / quizzes / PAs / discussions

Class
— abstract classes
— interfaces
— normal classes

fields — types — primitive types { int, double, boolean }
         \ objects (new)
              classes { String, Pair, Point, ... }

methods
— constructors
— general method (Returntype functionName (ArgType arg1, ···) { })
— main method

tester (t.checkExpect)
import tester.* ;   (·/run)
if / else if / else
for - loops
String methods
Math methods
Not guaranteed to be complete

PA 6&7

Thanks!