CS1101 Programming and Problem Solving

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Spring 2023

Logistics

- **ZY-4B** on **zyBook > Assignments**
  - Due: **Wednesday, Feb 22**, at 11:59pm
- **PA05 – W, A, B** on **zyBook > Chap 11**
  - Due: **Thursday, Feb 23**, at 11:59pm
- Midterm Exam 1 regrade requests due Tuesday, Feb 28

Recap

Q: What can we know about the question inside the while-loop?

```
while (y < 10) {
        y++;
        // Is y < 10?
}
```

Sometimes True

Recap

Q: What would be the output from the code below if the input entered is:
10 20 30 -1?

```
int sum = 0;
int number = 0;
while (number != -1){
        System.out.print("Enter a number (-1 to quit): ");
        number = console.nextInt();
        sum = sum + number;
}
System.out.println("The sum is " + sum);
```

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Hint: -1 is also added to the sum

Common Mistake

Q: What is wrong with the following code?

```
int sum = 4;
int num;
for (num = 1; num <= 4; ++num);{
    sum = sum + num;
}
System.out.println(sum);
```

The semicolon indicates the end of a statement, and hence, it leads to a for loop **with no controlled statements**.

Output: 9

Equivalent Code

```
int sum = 4;
int num;
for (num = 1; num <= 4; ++num){}
sum = sum + num;
System.out.println(sum);
```

Returning in a Loop

Q: What is the output of the following code?

```
public class ReturnInLoop {
    public static void main(String[] args) {
        int a = indexOfChar("Hello, World!", 'a');
        System.out.println("a: " + a);
        int o = indexOfChar("Hello, World!", 'o');
        System.out.println("o: " + o);
    }

    public static int indexOfChar(String str, char ch) {
        for (int i = 0; i < str.length(); ++i) {
            if (str.charAt(i) == ch) {
                return i;
            }
        }
    }
}
```

It's possible that the `ch` does not exist in the `str`, so the return statement is never reached.

```
ReturnInLoop.java:15: error: missing return statement
    }
    ^
1 error
```

Returning in a Loop

```
public class ReturnInLoop {
    public static void main(String[] args) {
        int a = indexOfChar("Hello, World!", 'a');
        System.out.println("a: " + a);
        int o = indexOfChar("Hello, World!", 'o');
        System.out.println("o: " + o);
    }

    public static int indexOfChar(String str, char ch) {
        for (int i = 0; i < str.length(); ++i) {
            if (str.charAt(i) == ch) {
                return i;
            }
        }
        return -1;
    }
}
```

```
$ javac ReturnInLoop.java
$ java ReturnInLoop
a: -1
o: 4
```

Recap – Coding Practice in Lec17

Q: Reproduce the following patterns with nested for loops

```
*
**
***
****
*****
```

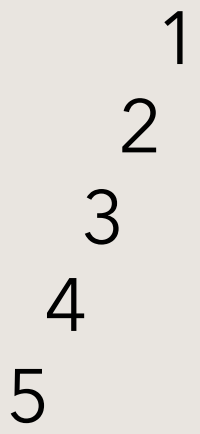
row (**i**)	num of * (**i**)
1	1
2	2
3	3
4	4
5	5

```
int row = 5;

for (int i = 1; i <= row; ++i) {
    for (int j = 1; j <= i; ++j) {
        System.out.print("*");
    }
    System.out.println();
}
```

Recap – Coding Practice in Lec17

Q: Reproduce the following patterns with nested for loops



row (**i**)	#space (**column - i**)
1	4
2	3
3	2
4	1
5	0

```
int row = 5;
int column = 5;

for (int i = 1; i <= row; ++i) {
    for (int j = 1; j <= column - i; ++j) {
        System.out.print(" ");
    }
    System.out.println(i);
}
```

Coding Practice

Q: Reproduce the following patterns with nested for loops

```
1
22
333
4444
55555
```

```
    1
   22
  333
 4444
55555
```

```
*********
 *******
  *****
   ***
    *
```

```
1
22
333
4444
55555
```

```java
int row = 5;

for (int i = 1; i <= row; ++i) {
    for (int j = 1; j <= i; ++j) {
        System.out.print(i);
    }
    System.out.println();
}
```

```
    1
   22
  333
 4444
55555
```

```java
int row = 5;
int column = 5;

for (int i = 1; i <= row; ++i) {
    int j;
    for (j = 0; j < column - i; ++j) {
        System.out.print(" ");
    }
    for (j = column - i; j < column; ++j) {
        System.out.print(i);
    }
    System.out.println();
}
```

```
*********
 *******
  *****
   ***
    *
```

row (**i**)	#space (**i**)	#star (**column - 2 * i**)
0	0	9
1	1	7
2	2	5
3	3	3
4	4	1

```java
int row = 5;
int column = 9;

for (int i = 0; i < row; i++) {
    for (int j = 0; j < i; j++) {
        System.out.print(" ");
    }
    for (int k = 0; k < column - 2 * i; k++) {
        System.out.print("*");
    }
    System.out.println();
}
```