

The background of the slide features a dark blue gradient with a complex, abstract network diagram. This diagram consists of numerous small, light blue circular nodes connected by thin, white lines, creating a web-like structure that spans the entire frame. The nodes are of varying sizes and are distributed across the space, with some clusters and some isolated points. The lines connecting them are also of varying lengths and orientations, giving the impression of a dynamic, interconnected system.

CS1101

Programming and Problem Solving

Dr. Gina Bai
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);
```


59

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

1
2
3
4
5

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

```
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

```
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

```

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();
}
```