Control Statements (Chapter 5 of Schilit)

Object Oriented Programming BS (AI) II

Compiled By:

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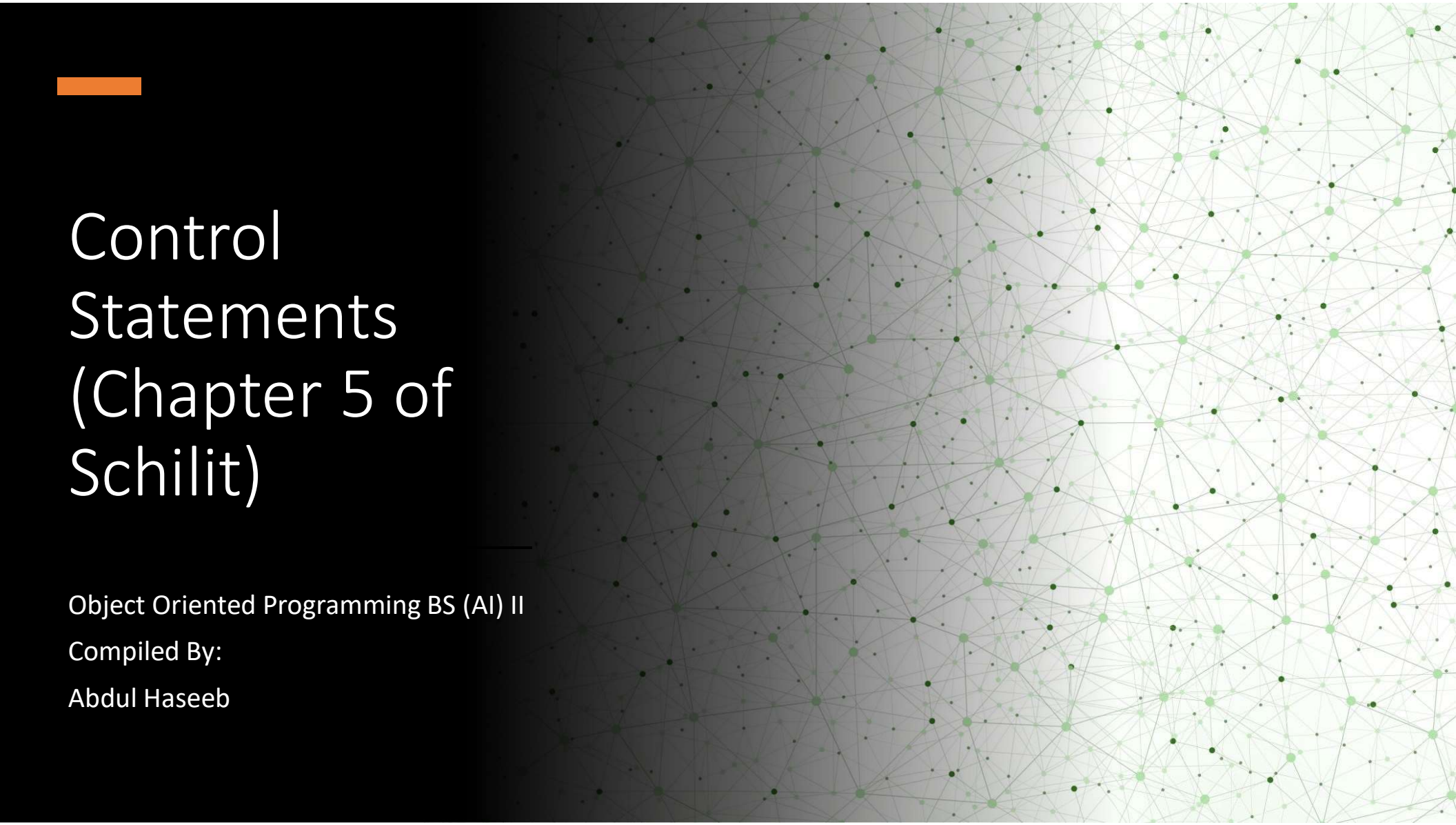


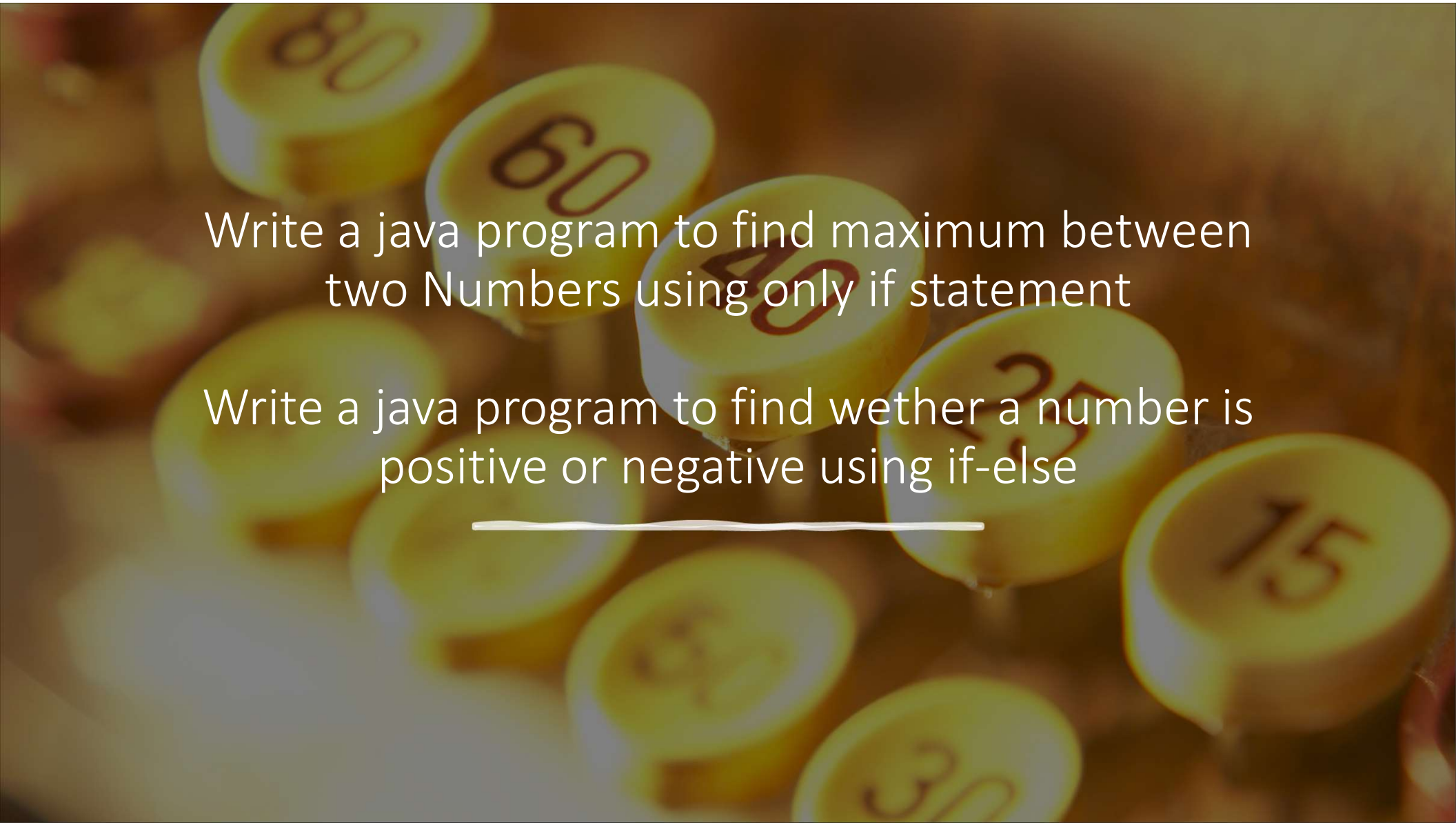
Control Statements

- Change the normal flow of execution
  - Selection Statement:
    - Flow changes based on outcome of an expression
  - Iteration Statement:
    - Repeat one or more statements
  - Jump Statements:
    - Allow you to jump from one section to other

if statement

if (*condition*) *statement1*;
else *statement2*;

```
int a, b;
//...
if(a < b) a = 0;
else b = 0;
```


Write a java program to find maximum between two Numbers using only if statement
Write a java program to find wether a number is positive or negative using if-else

Nested if

```
if(i == 10) {
  if(j < 20) a = b;
  if(k > 100) c = d; // this if is
  else a = c;        // associated with this else
}
else a = d;          // this else refers to if(i == 10)
```

Write a java program using nested if to develop a login program, it should take user name and password as input

if-else-if

```
if(condition)
   statement;
else if(condition)
   statement;
else if(condition)
   statement;
.
.
.
else
   statement;
```

Demo season according to month

switch statement

```
switch (expression) {
  case value1:
     // statement sequence
     break;

  case value2:
     // statement sequence
     break;
.
.
.
  case valueN :
     // statement sequence
     break;
  default:
     // default statement sequence
  }
```

```
// A simple example of the switch.
class SampleSwitch {
  public static void main(String args[]) {
    for(int i=0; i<6; i++)
      switch(i) {
        case 0:
          System.out.println("i is zero.");
          break;
        case 1:
          System.out.println("i is one.");
          break;
        case 2:
          System.out.println("i is two.");
          break;
        case 3:
          System.out.println("i is three.");
          break;
        default:
          System.out.println("i is greater than 3.");
      }
  }
}
```

```
// In a switch, break statements are optional.
class MissingBreak {
  public static void main(String args[]) {
    for(int i=0; i<12; i++)
      switch(i) {
        case 0:
        case 1:
        case 2:
        case 3:
        case 4:
          System.out.println("i is less than 5");
          break;
        case 5:
        case 6:
        case 7:
        case 8:
        case 9:
          System.out.println("i is less than 10");
          break;
        default:
```

Omitting break from some cases

Modify the seasons program using switch statement

Question

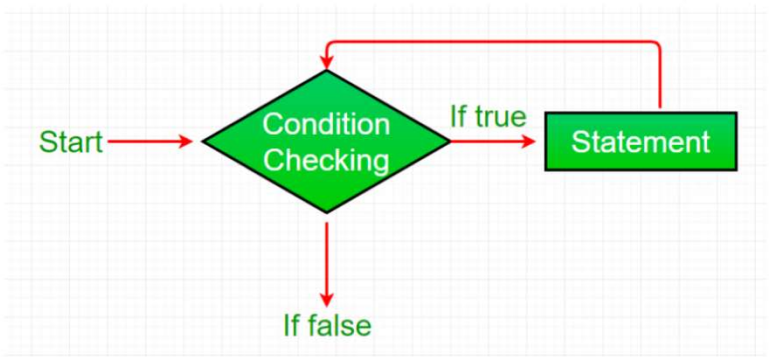
- Which types of data a switch can accept?

Iteration Statements

while, do-while, for

while

Flowchart For while loop (Control Flow):



- Used when number of repetitions is unknown
- Demo

```java
// Program to display numbers from 1 to 5

class Main {
  public static void main(String[] args) {

    // declare variables
    int i = 1, n = 5;

    // while loop from 1 to 5
    while(i <= n) {
      System.out.println(i);
      i++;
    }
  }
}
```

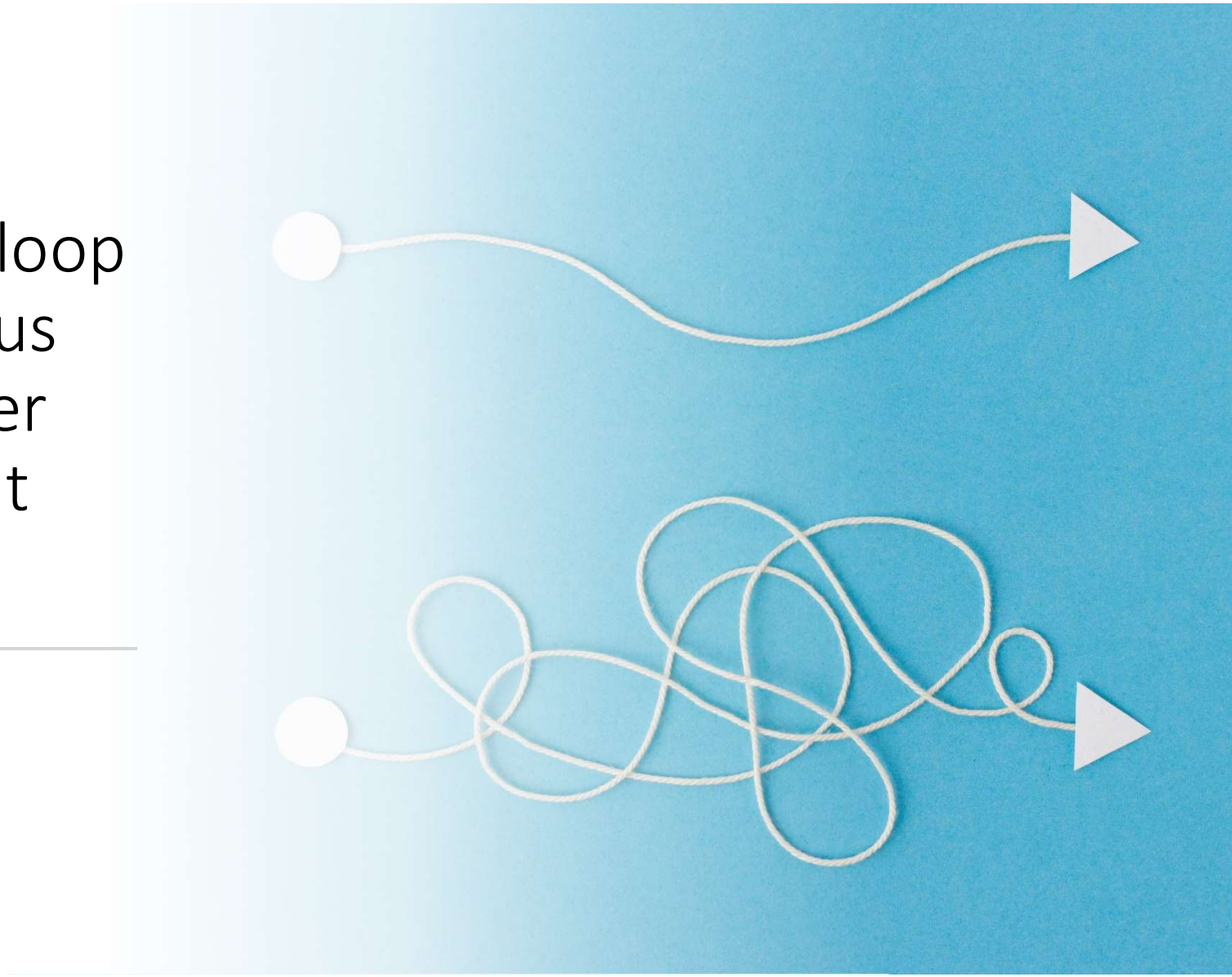
Iteration	Variable	Condition: i <= n	Action
1st	`i = 1` `n = 5`	`true`	`1` is printed. `i` is increased to **2**.
2nd	`i = 2` `n = 5`	`true`	`2` is printed. `i` is increased to **3**.
3rd	`i = 3` `n = 5`	`true`	`3` is printed. `i` is increased to **4**.
4th	`i = 4` `n = 5`	`true`	`4` is printed. `i` is increased to **5**.
5th	`i = 5` `n = 5`	`true`	`5` is printed. `i` is increased to **6**.
6th	`i = 6` `n = 5`	`false`	The loop is terminated

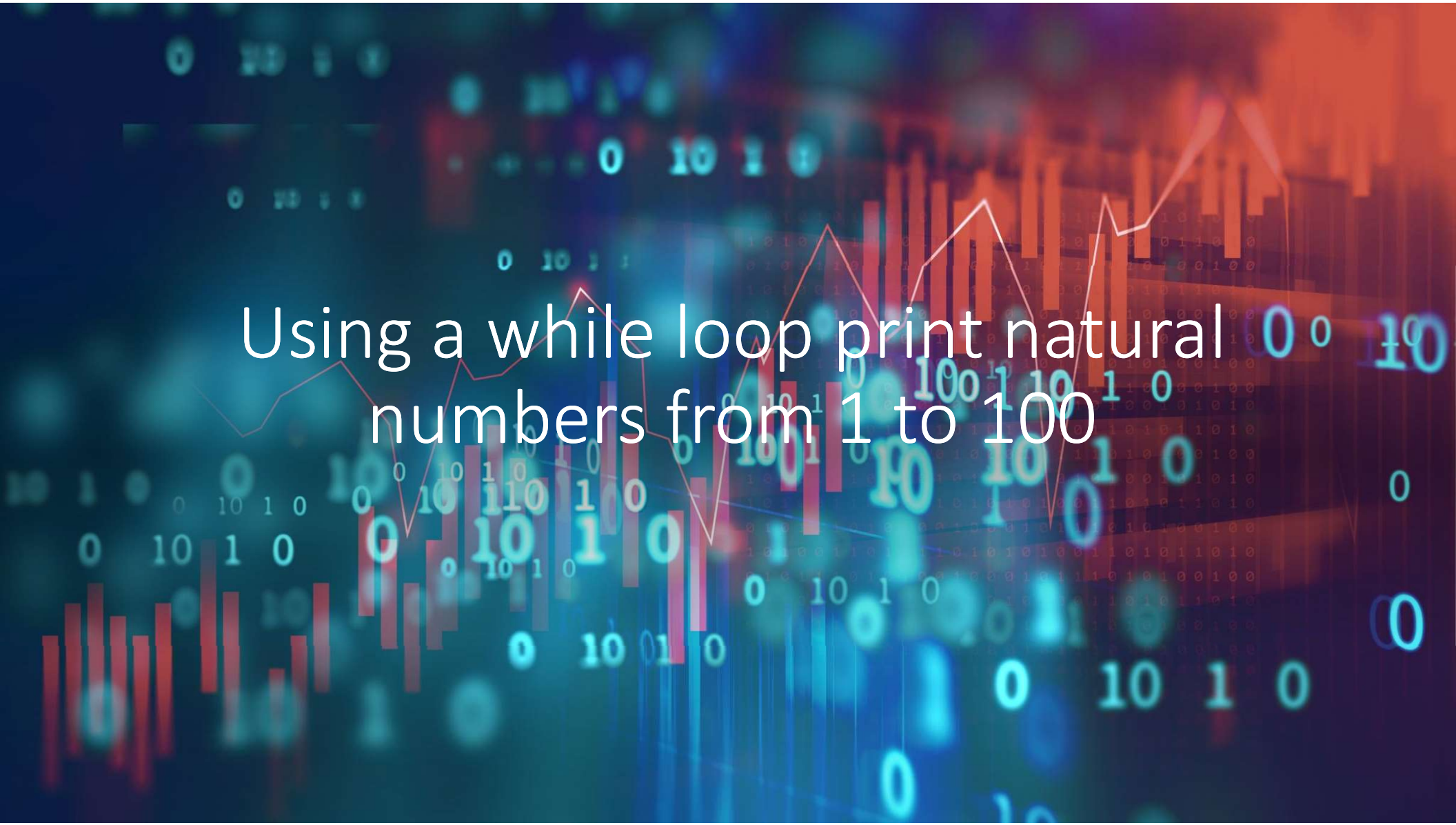
while

- while with no body

```
// The target of a loop can be empty.
class NoBody {
  public static void main(String args[]) {
    int i, j;

    i = 100;
    j = 200;

    // find midpoint between i and j
    while(++i < --j); // no body in this loop

    System.out.println("Midpoint is " + i);
  }
}
```

Using a while loop take continuous input from user until that input becomes one

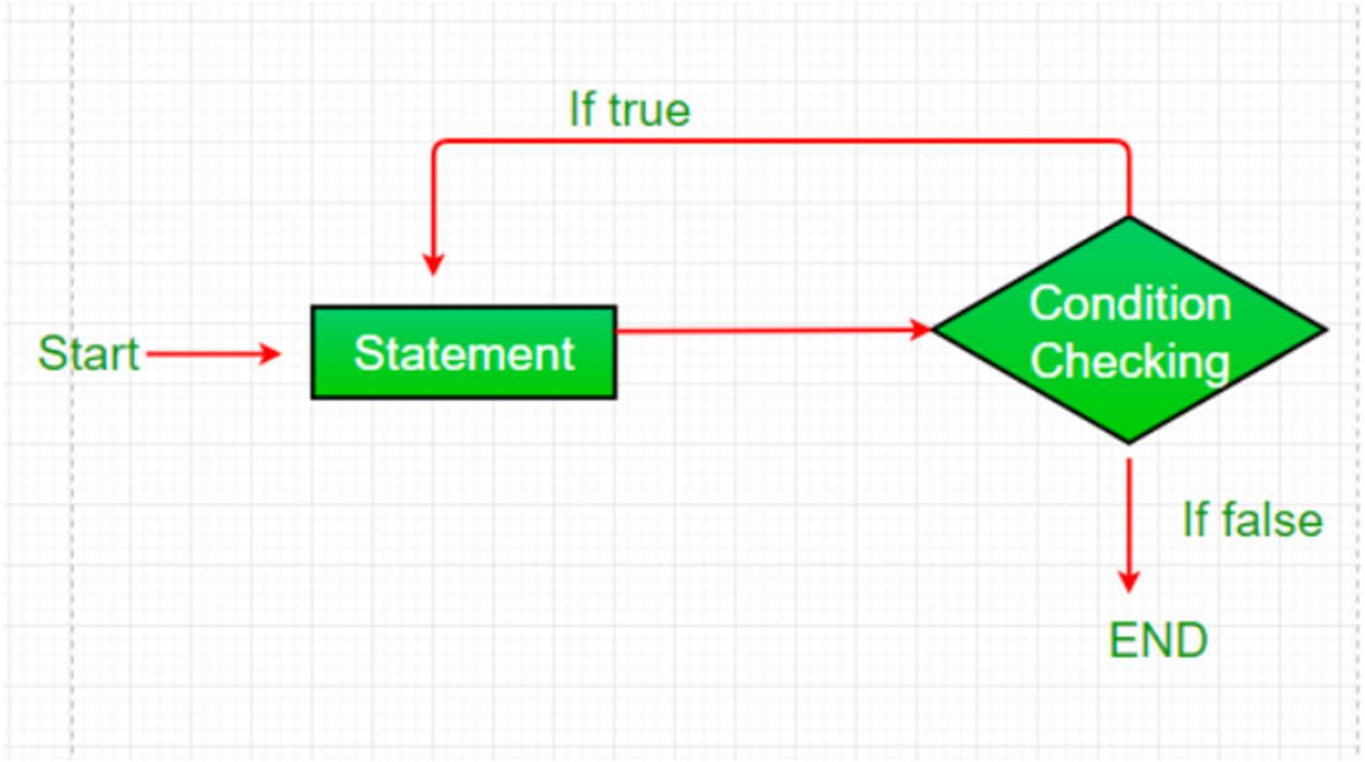


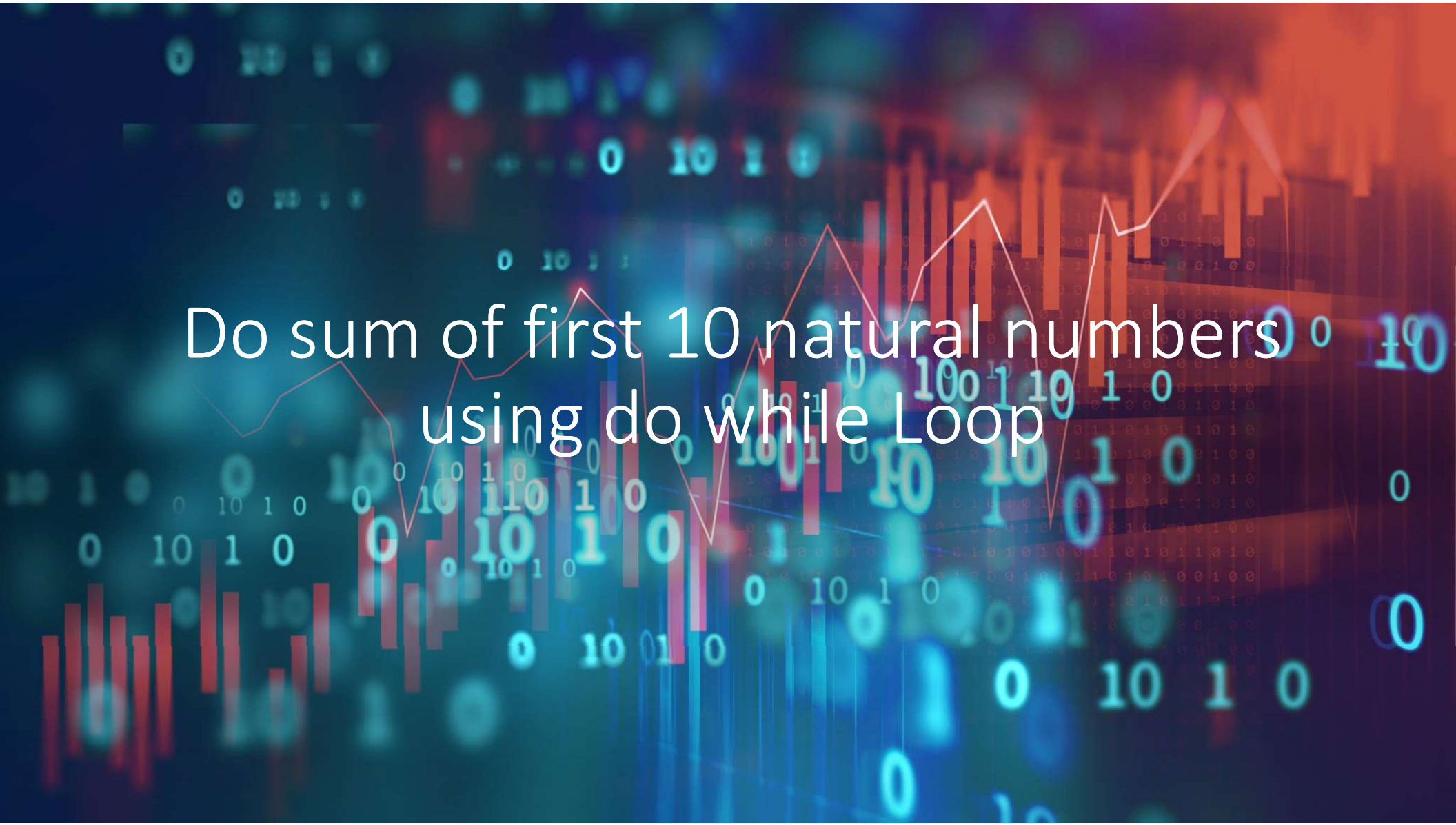

Using a while loop print natural numbers from 1 to 100

do-while

```
do {
  // body of loop
} while (condition);
```

Flowchart do-while loop:




Do sum of first 10 natural numbers
using do while Loop

Task

TAKE AN INTEGER NUMBER AS INPUT FROM USER, IT SHOULD BE GREATER THAN 100000

DIVIDE THAT NUMBER WITH 10, UNTIL IT BECOMES LESSER THAN 100

```
// infinite while loop
while(true){
    // body of loop
}
```

```
// infinite do...while loop
int count = 1;
do {
   // body of loop
} while(count == 1)
```

for

USED WHEN NUMBER OF ITERATIONS ARE ALREADY KNOWN

LOOP VARIABLE DECLARED INSIDE/OUTSIDE LOOP

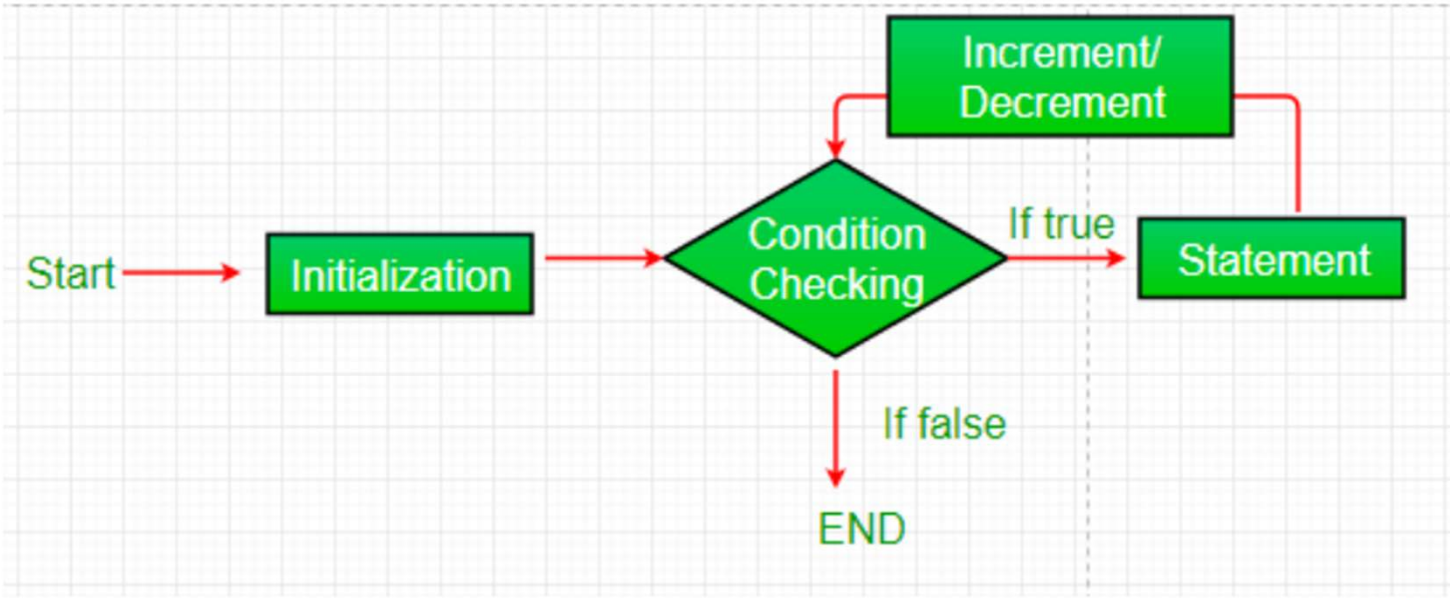
For

```
class Sample {
  public static void main(String args[]) {
    int a, b;

    b = 4;
    for(a=1; a<b; a++) {
      System.out.println("a = " + a);
      System.out.println("b = " + b);
      b--;
    }
  }
}
```

```
// Using the comma.
class Comma {
  public static void main(String args[]) {
    int a, b;

    for(a=1, b=4; a<b; a++, b--) {
      System.out.println("a = " + a);
      System.out.println("b = " + b);
    }
  }
}
```

For

Flow chart for loop (For Control Flow):



For

- All three parts of for loop are optional
- An infinite loop

```
for( ; ; ) {
  // ...
}
```

For loop Tasks

- Write a for loop to print first n natural numbers in reverse order
- Write a for loop to print output like this:
  - Line 1
  - Line 2
  - Line 3
  - .
  - .
  - .
  - Line 10