50+ loop Question

Chapter 1: Basic Loops
1.Print Even Numbers from 1 to 20
java
```
for (int i = 2; i <= 20; i += 2) {
   System.out.println(i);
}
```
Output:
2. Print Odd Numbers from 1 to 20
java
```
for (int i = 1; i <= 20; i++) {
if (i % 2 != 0) { System.out.println(i); } }
```
Output:
3. Sum of Numbers from 1 to 10
java
```
int sum = 0;
for (int i = 1; i <= 10; i++) {
   sum += i;
}
System.out.println(sum);
```
Output:
55
4. Factorial of a Number (5)
java
```
int num = 5;
int factorial = 1;
for (int i = 1; i <= num; i++) {
   factorial *= i;
}
System.out.println(factorial);
```
Output:
120

Chapter 2: Nested Loops
6. Print a 3x3 Grid
java
```
for (int i = 0; i < 3; i++) {
   for (int j = 0; j < 3; j++) {
 System.out.print("(" + i + "," + j + ") ");
   }
   System.out.println();
}
```
Output:
(0,0) (0,1) (0,2)
(1,0) (1,1) (1,2)
(2,0) (2,1) (2,2)
7. Multiplication Table (1 to 5)
java
Copy code
```
for (int i = 1; i <= 5; i++) {
```

23. Reversed Character Pyramid
java
```
char charValue = (char) ('A' + 5 - 1);
for (int i = 5; i >= 1; i--) {
   for (int j = 5 - i; j > 0; j--) {
      System.out.print(" ");
   }
   for (int k = 1; k <= i; k++) {
      System.out.print(charValue + " ");
   }
   charValue--;
   System.out.println();
}
```
Output:
 E E E E
 D D D D
  C C C
   B B
    A
Using Space Method -

26. Multiples of 3 and 5
java
```
for (int i = 1; i <= 20; i++) {
   if (i % 3 == 0 || i % 5 == 0) {
      System.out.print(i + " ");
   }
}
```
Output:
3 5 6 9 10 12 15 18 20
27. Printing Squares of Numbers
java
```
for (int i = 1; i <= 5; i++) {
   System.out.println(i + "^2 = " + (i * i));
}
```
Output:
1^2 = 1
2^2 = 4
3^2 = 9
4^2 = 16
5^2 = 25
28. Printing Cubes of Numbers
java
```
for (int i = 1; i <= 5; i++) {
   System.out.println(i + "^3 = " + (i * i * i));
}
```
Output:
1^3 = 1
2^3 = 8
3^3 = 27
4^3 = 64
5^3 = 125
29. Summing Even Numbers

```java
java
Copy code
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= 5; j++) {
        System.out.print(i * j + "\t");
    }
    System.out.println();
}
```
Output:
Copy code
```
1    2    3    4    5
2    4    6    8    10
3    6    9    12   15
4    8    12   16   20
5    10   15   20   25
```
8. Pascal's Triangle
java
```java
int rows = 5;
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < rows - i - 1; j++) {
        System.out.print(" ");
    }
    int value = 1;
    for (int j = 0; j <= i; j++) {
        System.out.print(value + " ");
        value = value * (i - j) / (j + 1);
    }
    System.out.println();
}
```
Output:
```
  1
  1 1
 1 2 1
 1 3 3 1
1 4 6 4 1
```
9. Print a 5x5 Matrix
java
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= 5; j++) {
        System.out.print(j + " ");
    }
    System.out.println();
}
```
Output:
```
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
```
10. Character Grid (A-Z)
java
```java
char ch = 'A';
for (int i = 0; i < 3; i++) {
```

```
4^3 = 64
5^3 = 125
```
29. Summing Even Numbers
java
```java
int total = 0;
for (int i = 2; i <= 10; i += 2) {
    total += i;
}
System.out.println(total);
```
Output: 30

30. Summing Odd Numbers
java
Copy code
```java
int total = 0;
for (int i = 1; i <= 10; i += 2) {
    total += i;
}
System.out.println(total);
```
Output: 25
31. Sum of Digits Using while Loop
java
```java
int number = 1234;
int sum = 0;
while (number != 0) {
    sum += number % 10;
    number /= 10;
}
System.out.println(sum);
```
Output: 10
32. Reverse of a Number Using while Loop
java
```java
int number = 1234;
int reverse = 0;
while (number != 0) {
    reverse = reverse * 10 + number % 10;
    number /= 10;
}
System.out.println(reverse);
```
Output: 4321
33. Counting Vowels in a String
java
```java
String str = "Hello World";
int count = 0;
for (int i = 0; i < str.length(); i++) {
    char c = str.charAt(i);
    if (c == 'A' || c == 'E' || c == 'I' || c == 'O'
|| c == 'U' ||
        c == 'a' || c == 'e' || c == 'i' || c == 'o' ||
c == 'u') {
        count++;
    }
}
```

```java
java
char ch = 'A';
for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 3; j++) {
        System.out.print(ch + " ");
        ch++;
    }
    System.out.println();
}
```
Output:

A B C

D E F

G H I

Chapter 3: Pattern Printing
11. Left-Aligned Pyramid
java

Copy code
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print("*");
    }
    System.out.println();
}
```
Output:

markdown

Copy code

*

**

***

****

*****

12. Inverted Right-Angle Triangle Pattern
java
```java
for (int i = 5; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
        System.out.print("*");
    }
    System.out.println();
}
```
Output:

*****

****

***

**

*

13. Pyramid Pattern
java
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
```

```java
        count++;
    }
}
System.out.println(count);
```
Output: 3
34. Finding GCD Using <u>Euclidean Algorithm</u>
java
```java
public class GCD {
    public static void main(String[] args) {
        int a = 56, b = 98;
        while (b != 0) {
            int temp = b;
            b = a % b;
            a = temp;
        }
        System.out.println(a);
    }
}
```
Output: 14
35. Finding LCM Using GCD
java
```java
public class LCM {
    public static void main(String[] args) {
        int a = 15, b = 20;
        int gcd = gcd(a, b);
        int lcm = (a * b) / gcd;
        System.out.println(lcm);
    }
    public static int gcd(int a, int b) {
        while (b != 0) {
            int temp = b;
            b = a % b;
            a = temp;
        }
        return a;
    }
}
```
Output: 60
36. Printing Odd Numbers in a Range
java
```java
for (int i = 1; i <= 20; i += 2) {
    System.out.print(i + " ");
}
```
Output: 1 3 5 7 9 11 13 15 17 19
37. Printing Even Numbers in a Range
java
```java
for (int i = 2; i <= 20; i += 2) {
    System.out.print(i + " ");
}
```
Output: 2 4 6 8 10 12 14 16 18 20
Chapter 5: More Complex Patterns
 Reversed Number Triangle
java

```java
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= 2 * i - 1; k++) {
        System.out.print("*");
    }
    System.out.println();
}
```
Output:

markdown

Copy code
```
    *
   ***
  *****
 *******
*********
```

Using space Method -

14. Inverted Pyramid Pattern

java
```java
for (int i = 5; i >= 1; i--) {
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= 2 * i - 1; k++) {
        System.out.print("*");
    }
    System.out.println();
}
```
Output:
```
*********
 *******
  *****
   ***
    *
```

Using Space Method -

15. Diamond Pattern

java
```java
int n = 5;
for (int i = 1; i <= n; i += 2) {
    for (int j = 0; j < (n - i) / 2; j++) {
        System.out.print(" ");
    }
    for (int k = 0; k < i; k++) {
        System.out.print("*");
    }
    System.out.println();
}
for (int i = n - 2; i >= 1; i -= 2) {
```

Chapter 5: More Complex Patterns
Reversed Number Triangle

java
```java
for (int i = 5; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
        System.out.print(j);
    }
    System.out.println();
}
```
Output
```
12345
1234
123
12
1
```

19. Right-Angle Triangle Pattern with Numbers

java

Copy code
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(j);
    }
    System.out.println();
}
```
Output:

yaml

Copy code
```
1
12
123
1234
12345
```

41. Number Pyramid with Decreasing Rows

java

Copy code
```java
for (int i = 5; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
        System.out.print(j + " ");
    }
    System.out.println();
}
```
Output

Copy code
```
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

42. Diamond Pattern with Numbers

```
        System.out.println();
}
for (int i = n - 2; i >= 1; i -= 2) {
    for (int j = 0; j < (n - i) / 2; j++) {
        System.out.print(" ");
    }
    for (int k = 0; k < i; k++) {
        System.out.print("*");
    }
    System.out.println();
}
```

Output:
```
    *
  ***
*****
  ***
    *
```

Using Space Method -

16. Hollow Square Pattern
java
```
int n = 5;
for (int i = 0; i < n; i++) {
    for (int j = 0; j < n; j++) {
if (i == 0 || i == n - 1 || j == 0 ||
j == n - 1) {
            System.out.print("*");
        } else {
            System.out.print(" ");
        }
    }
    System.out.println();
}
```
Output:
```
*****
*   *
*   *
*   *
*****
```

17. Hollow Right-Angle Triangle
java
```
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        if (j == 1 || j == i || i == 5) {
            System.out.print("*");
        } else {
            System.out.print(" ");
        }
    }
    System.out.println();
}
```
Output:
```
*
* *
```

```
1 2
1
```

42. Diamond Pattern with Numbers
java
Copy code
```
int n = 5;
for (int i = 1; i <= n; i++) {
    for (int j = n - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= i; k++) {
        System.out.print(k + " ");
    }
    System.out.println();
}
for (int i = n - 1; i >= 1; i--) {
    for (int j = n - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= i; k++) {
        System.out.print(k + " ");
    }
    System.out.println();
}
```
Output:
markdown
Copy code
```
    1
   1 2
  1 2 3
 1 2 3 4
1 2 3 4 5
 1 2 3 4
  1 2 3
   1 2
    1
```

44. Pyramid with Numbers
java
Copy code
```
for (int i = 1; i <= 5; i++) {
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= i; k++) {
        System.out.print(k + " ");
    }
    System.out.println();
}
```
Output:
markdown
Copy code
```
    1
   1 2
```

Output:
```
*
* *
*   *
*     *
*****
```

20. Character Pyramid
java
```java
char ch = 'A';
for (int i = 1; i <= 5; i++) {
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= i; k++) {
        System.out.print(ch + " ");
        ch++;
    }
    System.out.println();
}
```

Output:
```
    A
   B C
  D E F
 G H I J
K L M N O
```

Chapter 4: Advanced Patterns Characters
21. Upper-Left Triangle Pattern with Incremental Characters
java
```java
char charValue = 'A';
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(charValue + " ");
        charValue++;
    }
    System.out.println();
}
```

Output:
```
A
B C
D E F
G H I J
K L M N O
```

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

45. Inverted Pyramid with Numbers
java
```java
for (int i = 5; i >= 1; i--) {
    for (int j = 5 - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= i; k++) {
        System.out.print(k + " ");
    }
    System.out.println();
}
```

Output:
markdown
```
1 2 3 4 5
 1 2 3 4
  1 2 3
   1 2
    1
```

46. Hollow Diamond Pattern
java
```java
int n = 5;
for (int i = 1; i <= n; i++) {
    for (int j = n - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= 2 * i - 1; k++) {
        if (k == 1 || k == 2 * i - 1) {
            System.out.print("*");
        } else {
            System.out.print(" ");
        }
    }
    System.out.println();
}
for (int i = n - 1; i >= 1; i--) {
    for (int j = n - i; j > 0; j--) {
        System.out.print(" ");
    }
    for (int k = 1; k <= 2 * i - 1; k++) {
        if (k == 1 || k == 2 * i - 1) {
            System.out.print("*");
        } else {
            System.out.print(" ");
        }
    }
```

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

Output:

markdown
Copy code
```
    *
   * *
  *   *
 *     *
*********
 *     *
  *   *
   * *
    *
```