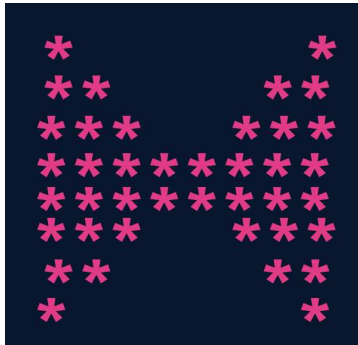


# Java - Introduction to Programming

## Lecture 6

### Patterns - Part 2

1.



```
import java.util.*;

public class Solutions {
    public static void main(String args[]) {
        int n = 4;

        //upper part
        for(int i=1; i<=n; i++) {
            for(int j=1; j<=i; j++) {
                System.out.print("*");
            }

            int spaces = 2 * (n-i);
            for(int j=1; j<=spaces; j++) {
                System.out.print(" ");
            }

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

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

```

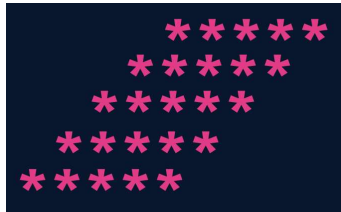
//lower part
for(int i=n; i>=1; i--) {
    for(int j=1; j<=i; j++) {
        System.out.print("*");
    }

    int spaces = 2 * (n-i);
    for(int j=1; j<=spaces; j++) {
        System.out.print(" ");
    }

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

```

2.



```

import java.util.*;

public class Solutions {
    public static void main(String args[]) {
        int n = 5;
    }
}

```

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

3.

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

```
import java.util.*;

public class Solutions {
    public static void main(String args[]) {
        int n = 5;

        for(int i=1; i<=n; i++) {
            //spaces
            for(int j=1; j<=n-i; j++) {
                System.out.print(" ");
            }

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

4.

```

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

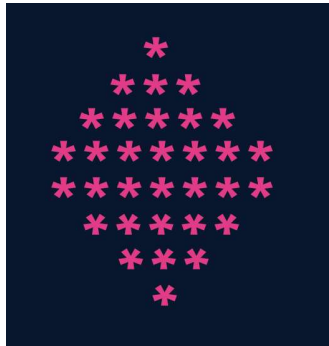
```
import java.util.*;

public class Solutions {
    public static void main(String args[]) {
        int n = 5;
        for(int i=1; i<=n; i++) {
            //spaces
            for(int j=1; j<=n-i; j++) {
                System.out.print(" ");
            }

            //first part
            for(int j=i; j>=1; j--) {
                System.out.print(j);
            }

            //second part
            for(int j=2; j<=i; j++) {
                System.out.print(j);
            }
            System.out.println();
        }
    }
}
```

5.



```
import java.util.*;

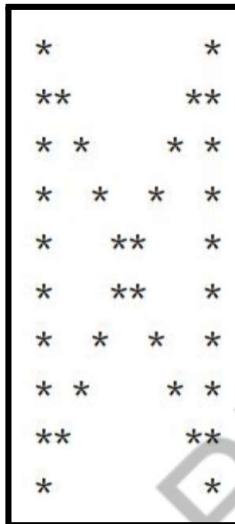
public class Solutions {
    public static void main(String args[]) {
        int n = 5;

        //upper part
        for(int i=1; i<=n; i++) {
            //spaces
            for(int j=1; j<=n-i; j++) {
                System.out.print(" ");
            }
            for(int j=1; j<=2*i-1; j++) {
                System.out.print("*");
            }
            System.out.println();
        }

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

## Homework Problems

1. Print a hollow Butterfly.



2. Print a hollow Rhombus.

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

3. Print Pascal's Triangle.

```
1  
1 1  
1 2 1  
1 3 3 1  
1 4 6 4 1
```

4. Print half Pyramid.

```
1
```

1 2

1 2 3

1 2 3 4

1 2 3 4 5

**5. Print Inverted Half Pyramid.**

1111

222

33

4