

Ques 21:
n = 5



$$\text{space} = n * 2 - 3$$

$$\text{star} = 1 \quad \text{row} = 1$$

```

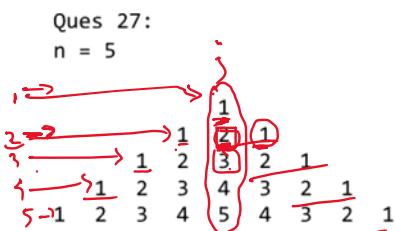
while (row <= n) {
    //star
    int i = 1
    while (i <= star) {
        cout(i); i++
    }
    //space
    int j = 1
    while (j <= space) {
        cout(" "); j++
    }
    //star
    int k = 1
    if (row == n) {
        k = 2
    }
    //next line
    space -= 2
    star++; row++
    cout()
}

```

Number Pattern

Ques 23:
n = 5

		1		
	1	1	1	
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1



$$n = 5 \quad \text{star} = 1 \quad \text{space} = \frac{n-1}{4}$$

```

while (row <= n) {
    //space
    int i = 1
    while (i <= space) {
        cout(" ");
        i++
    }
    //star
    int j = 1, val = 1
    while (j <= star) {
        cout(val);
        j++
        if (j < row) val++;
        else val--;
    }
    j++
}

```

$$\text{space} = \frac{n-1}{4} \quad \text{star} = \frac{n+1}{2}$$

space --
star += 2
row++
cout()

```

int n = 5;
int space = n-1;
int star = 1;
int row = 1;

while (row <= n) {
    // Space
    int i = 1;
    while (i <= space) {
        System.out.print("\t");
        i++;
    }
    // Star
    int j = 1;
    int val = 1;
    while (j <= star) {
        System.out.print(val + "\t");
        if (j < row) val++;
        else val--;
        j++;
    }
    // Next line
    row++;
    space--;
    star += 2;
    System.out.println();
}

```

$\text{space} = \underline{\cancel{5}} \underline{\cancel{4}}$ $\text{star} = \cancel{5} \underline{\cancel{4}}$
 $\text{row} = \cancel{1} \underline{\cancel{2}}$

$i = 5$ $j = 0$
 $3 < 2$ $3 < 3$
 $4 < 3$

$\rightarrow \underline{\cancel{1}} \underline{\cancel{2}} \underline{\cancel{3}} \underline{\cancel{4}} \underline{\cancel{5}}$
 $\rightarrow \underline{\cancel{1}} \underline{\cancel{2}} \underline{\cancel{3}} \underline{\cancel{4}} \underline{\cancel{5}} \underline{\cancel{1}}$
 $\rightarrow \underline{\cancel{1}} \underline{\cancel{2}} \underline{\cancel{3}} \underline{\cancel{4}} \underline{\cancel{5}} \underline{\cancel{1}} \underline{\cancel{2}}$
 $\rightarrow \underline{\cancel{1}} \underline{\cancel{2}} \underline{\cancel{3}} \underline{\cancel{4}} \underline{\cancel{5}} \underline{\cancel{4}} \underline{\cancel{3}} \underline{\cancel{2}} \underline{\cancel{1}}$

Ques 32:

$n = 5$

```

1
2 * 2
3 * 3 * 3
4 * 4 * 4 * 4
5 * 5 * 5 * 5 * 5
4 * 4 * 4 * 4
3 * 3 * 3
2 * 2
1

```

Ques 33:

$n = 10$

1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10

$\text{val} = 10$ $\text{space} = n - 1$
 $\text{star} = 1$

$i = 1$ $\text{val} = 10$
 $\text{while } (i \leq \text{star}) \{$
 $\quad \text{if } (\text{val} == n) \{$
 $\quad \quad \text{cout}(0)$
 $\quad \}$
 $\quad \text{if } (i < \text{row}) \{$
 $\quad \quad \text{val}++$
 $\}$
 $\quad \text{else}$ $\text{val}--$