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ASSIGNMENT

Pattern

Q1.

CODE:

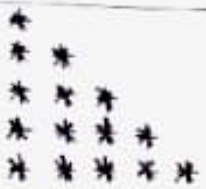
```
n = int(input("enter no: "))
for i in range(n):
    for j in range(n):
        print("*", end=" ")
    print()
```

DRY RUN:-

i = 0 → j = 0 .. 3 → * * * *
i = 1 → j = 0 .. 3 → * * * *
i = 2 → j = 0 .. 3 → * * * *
i = 3 → j = 0 .. 3 → * * * *

OBSERVATION:-
Make a full square of stars.

Q2.



CODE:

```
n = int(input("enter no:"))
for i in range(1, n+1):
    for j in range(i):
        print("*", end=" ")
    print()
```

DRY RUN:-

i = 1 → j = 0 → *
i = 2 → j = 0,1 → * *
i = 3 → j = 0,2 → * * *
i = 4 → j = 0,..3 → * * * *
i = 5 → j = 0,..4 → * * * * *

OBSERVATION:-
Stars keep increasing row by row (triangle shape).

Q3.

CODE:

```
n = int(input("enter no:"))
for i in range(n, 0, -1)
for j in range(i):
    print("*", end=" ")
print()
```

DRY RUN:-

i = 5 → j = 0..4 → * * * * *
i = 4 → j = 0..3 → * * * *
i = 3 → j = 0..2 → * * *
i = 2 → j = 0..1 → * *
i = 1 → j = 0 → *

OBSERVATION:-
Star keep decreasing row by row (inverted triangle).

Q4.
```
1
1*
1*3
1*3*
1*3*5
```

CODE:-
```
n = int(input("enter no:"))
for i in range(1, n+1):
    for j in range(1, i+1):
        if j%2 == 0:
            print("*", end="")
        else:
            print(j, end="")
    print()
```

DRY RUN:-
i=1 → j=1 → 1
i=2 → j=1 → 1, j=2 → *
i=3 → j=1 → 1, j=2 → *, j=3 → 3,
i=4 → j=1 → 1, j=2 → * j=3 → 3, j=4 → *
i=5 → j=1 → 1, j=2 → * j=3 → 3, j=4 → *,
j=5 → 5

OBSERVATION:-
Number at odd places. Start at even place.

Q5.
```
*___*
*___*
*___*
*___*
*___*
```

CODE:-
```
n = int(input("enter no:"))
for i in range(n):
    print("*", "_"*(n-2), "*")
```

DRY RUN:-
Each row → * _ _ _ *
[5 _ _ _ ~~rep~~ repeat]

OBESERVATION:-
Square shape but hollow inside with _.

Q6.
```
*____*
*___*
*__*
*_*
**
```

CODE:-
```
n = int(input("enter no:"))
for i in range(n, 0, -1):
    print("*" * (i-1), "*")
```

DRY RUN:-
i=5 → *_____*
i=4 → *____*
i=3 → *___*
i=2 → *__*
i=1 → **

OBESERVATION:-
Inverted hollow triangle with _ b/w stars.

Q7.
```
   *
  ***
 * * *
*** ***
```

CODE:-
```
n = int(input("enter no:"))
for i in range(1, n+1):
    print(" "*(n-1), "*"*(2*i-1))
```

DRY RUN:-
i = 1 → 4 space + *
i = 2 → 3 space + ***
i = 3 → 2 space + *****
i = 4 → 1 space + *******
i = 5 → 0 space + *********

OBESERVATION:-
Star from a right-side Δ.

Q8. 

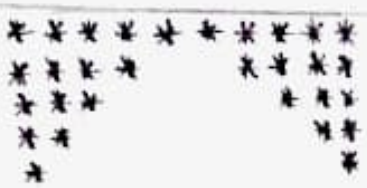
CODE:-

```
n = int(input("enter no:"))
for i in range(n):
    print(" "*i, "*"*(n-i))
```

DRY RUN:-

i = 0 → 0 space + 5 stars
i = 1 → 1 space + 4 stars
i = 2 → 2 space + 3 stars
i = 3 → 3 space + 2 stars
i = 4 → 4 space + 1 stars

OBSERVATION:-
Star from a right side triangle (like ▽)

Q9. 

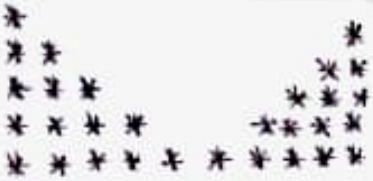
CODE:-

```
n = int(input("enter no:"))
for i in range(n,0,-1):
print("*"*i + " "*(2*(n-i))
+ "*"*i)
```

DRY RUN:-

i = 5 → * * * * * * * * *
i = 4 → * * * * * * *
i = 3 → * * * * *
i = 2 → * * *
i = 1 → *

OBSERVATION:-
Look like top half of an hourglass

Q10 

CODE:-

```
n = int(input("enter no: "))
for i in range(1,n+1):
    print("*"*i + " "*(2*
    (n-1)) + "*"*i)
```

DRY RUN:-

i = 1 → * + 8 space + *
i = 2 → * * + 6 space + * *
i = 3 → * * * + 4 space + * * *
i = 4 → * * * * + 2 space + * * * *
i = 5 → * * * * * + 0 space + * * * * *

OBSERVATION:-
Look like button half of an hourglass

Q11. 

CODE:-

```
n = int(input("enter no:"))
for i in range(n,0,-1):
    print("*"*i + " "*(2*(n-i))
    + "*"*i)
for i in range(1,n+1):
    print("*"*i + " "*(2*(n-i))
    + "*"*i).
```

DRY RUN:- First loop

i = 5 → * * * * * * * * *
i = 4 → * * * *
i = 3 → * * *
i = 2 → * *
i = 1 → *

Second loop

OBSERVATION:-
full hourglass / diamond pattern.

Q12.
```
1
1 2
1 2 3
1 2 3 4
```

CODE :-
```
n = int(input("enter no:"))
for i in range(1,n+1):
    for j in range(1,i+1):
        print(j, end = " ")
    print()
```

DRY RUN:-
i = 1 → j = 1 → 1
i = 2 → j = 1,2 → 1 2
i = 3 → j = 1..3 → 1 2 3
i = 4 → j = 1..4 → 1 2 3 4

OBSERVATIONS:-
Numbers start from 1 in each row.

Q13.
```
1 2 3 4
1 2 3
1 2
1
```

CODE :-
```
n = int(input("enter no:"))
for i in range(n,0,-1):
    for j in range(1,i+1):
        print(j, end = " ")
    print()
```

DRY RUN:-
i = 4 → j = 1..4 → 1 2 3 4
i = 3 → j = 1..3 → 1 2 3
i = 2 → j = 1..2 → 1 2
i = 1 → j = 1 → 1

OBSERVATION:-
Numbers start from 1 in each row, Δ but upside down.

Q14
```
1
2 3
4 5 6
7 8 9 10
```

CODE :-
```
n = int(input("enter no:"))
k = 1
for i in range(1,n+1):
    for j in range(i):
        print(k, end = " ")
        k += 1
    print()
```

DRY RUN:-
i = 1 → k = 1 → print 1 → k = 2
i = 2 → k = 2,3 → print 2 3 → k = 4
i = 3 → k = 4, 5, 6 → print 4 5 6 → k = 7
i = 4 → k = 7, 8, 9, 10 → print 7 8 9 10 → k = 11.

OBSERVATION :-
Number keep increasing continously row by row.

Q15.
```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

CODE :-
```
n = int(input("enter no:"))
for i in range(1,n+1):
    print("* " * i)
for i in range(n-1,0,-1):
    print("* " * i).
```

DRY RUN:- 1st loop
i = 1 → *
i = 2 → * *
i = 3 → * * *
i = 4 → * * * *

2nd loop
i = 4 → * * * *
i = 3 → * * *
i = 2 → * *
i = 1 → *