Date.....

Patterns > increase logic building > strong the concept of loops.

1) Print solid Rectangle

\* \* \* \*

\* \* \* \* \*

\* \* \* \* \*

\* \* \* \* \*

Think process of patterns,

Step 1, observe the Rows, i.e., How

many Rows are in given

pattern.

step2, column observation, i.e., How many columns are in given pattern.

\* \* \* \* \*

8 8 8 8 8

8 8 8 B

\* \* \* \* \*

K K Y > 2 col.4

col. o col. 1 col. 2 col. 3

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-

Total 5 columns

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step3, now check how many stars (\*) are printed in each column.

column 0 - 3 stars (\*)
column 1 - 3 stars (\*)
column 2 - 3 stars (\*)
column 3 - 3 stars (\*) column 4 - 3 stars (\*)

Generally, patterns is printed using Nested Loops

2 100ps sometimes more
than 2 100ps

outer inner
100p 100p

represent represent rows columns

for () 11 outer 100p for rows Eg!-

for () Il inner loop for columns

Destanale 10AA
Print solid Rectangle
# # # # # T- 80WO
* * * * * - YOW
A A R A - YOW 2
* * * * * TOW 2
A PROPERTY OF THE PROPERTY OF
stepl, First create the outer 100p
stept, FIRST Creating rows so
tor representing rows, so
for (inti:0; i < 4; itt) {
3
this loop is run for
i, o, then i21, then
i 2 2 % lastly i 2 3.
Means, total 4 times for
4 rows.
Now, in each row we have 5
stars (*) means we have
to create a loop that will
run 5 times for each row.
step 2, create inner loop which will sun 5 times for each row.
run 5 times for each row
so,
for (int 1 20: 1 < 5. 1++) {
for (int j 20; j < 5; j+t) {  cout << " *";
3
Ekinal
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code:-

#include(iostream)
using namespace std;
int main() {
 cout << endl;
 for(int row = 0; row < 4;

5

for (int col 20; col (5; coltt)

2

cout << " \* ";

3 cout << end1;

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return 0;

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12 don't god 0 2 309 (200)

by November of activities of the

3

2) Print solid square. 8 8 8 7 - 10 WO & & & & - YOW 18 & & & - YOW 2 & & X - YOW 3 code:-Theoty propro esset Aserts, 1991 #include (iostream) using namespace std; int main () { cout << end1; for (int r = 0; r < 4; r + 1){ (19)19 for (int c 20; c < 4; c++) { Cout << "\* " cout << end! return 0; ( p) work 2 )

3) Hollow Restangle?

or or or or or \* OK 5-5 0 - FOW 1 \* 8X & / & X - YOW 3 OX ex spares.

stepl, theck how many stars (\*) are printed in each row.

> 80W 0 - 5 Stars (\*) - 1st place me star (\*) row 2nd place me space () 3rd place me space() 4th place me space() 5th place me star (7) row 2 - 1st place me star (\*) 2nd place me space() 3rd place me spacel) 4th place me space() 5th place me star (\*) row 3 - 5 stars (\*)

There are 5 things printed in each row, i.e.,

row 0 - 5 stars (\*)

row 1 - 1 star (\*), 3 spaces (), 1 star 6 row 2 - 1 star (\*), 3 spaces (), 1 star row 3 - 5 stars (x)

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outer 100p,

forlint i = 0; i < 4; i++) {
}

Inner 100p,

0000

for (int j 20; j < 5; j + + ) {

Condition to print row 1 & row 2, i.e., print spaces (-)

if (row 22 0 11 row 22 3) {
 print 5 stars (\*)
}

print 1 star (\*)
print 3 spaces (\_)
print 1 star (\*)

```
code !-
     #include (iostream)
     using namespace sta;
      int main() {
         cout << endl;
         forlint r20; r < 4, 8++ ) { ~
            if (822011 8223) {
               forlint ( O; C < 5; C++)
                cout << " * ";
9.1, Sword Bunk fretto of wollighnoo
             else { cout << '* ";
              for(int c 20; c (3; c++)
               cout << " * ":
            cout << endl;
         return 0;
```

```
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Generil Code:-
     Hinclude (iostream)
     using namespace std;
      int main () E'
        cout << end!
         int rount, count;
cout << "Enter rows = ";
        cin >> r count;
cout << "Enter column";
       cin >> ccount;
         for (int 8 2 0; 8 < r count;
         if (8220118228Count-1)
         * Funt 12 - 8 max
         for(int c 20; c < ccount;
          Wholet Die Zone C++)
   3 Louis 3 Louis (x 1 * o "; work)
         else {
          cout << "* ";
              for (int c = 0; c < ccount
                     -2; c+t)
              cout << " * ";
           cout << endl;
Teacher's Sign.....
```

(4) Half Pyramid.

- YOW O OX + & - row 1 8 -row 2 OK \* ex & & & & Trow 3 \* \* \* \* - YOWY ox \$ BK 8K 8K & X-YOWS OK .

step 1, check now many stars (\*)
are printed in each row.

row 0 - 1 star (\*)
row 1 - 2 star (\*)
row 2 - 3 star (\*)
row 3 - 4 star (\*)
row 4 - 5 star (\*)
row 5 - 6 star (\*)

How many stars are printed in each row? (Formula)

> stars that are printed in each row are row no. + 1, i.e.

YOW 0 = YOW 0 + 1 2 1 (\*)
YOW 1 = YOW 1 + 1 2 2 (\*)
YOW 2 = YOW 2 + 1 = 3 (\*)
YOW 3 = YOW 3 + 1 = 4 (\*)
YOW 4 = YOW 4 + 1 = 5 (\*)
YOW 5 = YOW 5 + 1 = 6 (\*)

bimprin HOR BOARSHAR ocode!-#include (iostream) using namespace std; int main () \* \* \* Int & count; cout << 'in enter rows = "; cin >> rcount; for (int x 2 0; x < x count; 8++ for (int c:0; c < r+1; c++) 10 1 cout << " \* "; " ( \*)} 1x017 11 -Cout ( end!; 361/10/10/10 return o: di betaire evo work unom wolf

3 Inverted Half pyramid.

stepl, (heck how many stars (\*)
are printed in each row,

 YOW 0
 6 Stars (\*)

 YOW 1
 5 Stars (\*)

 YOW 2
 4 Stars (\*)

 YOW 3
 3 Stars (\*)

 YOW 4
 2 Stars (\*)

 YOW 5
 1 Star (\*)

How many stars are printed in each row? (Formula)

Tow are total rows - row no.

Tow 0 = 6 - 0, i.e., 6 stars (\*)

Tow 1 = 6 - 1, i.e., 5 stars (\*)

Tow 3 = 6 - 2, i.e., 4 stars (\*)

Tow 3 = 6 - 3, i.e., 3 stars (\*)

Tow 4 = 6 - 4, i.e., 2 stars (\*)

Tow 5 = 6 - 5, i.e., 1 star (\*)

6

6) Numeric Half Pyramid.

123 - YOW 2 123 - YOW 2 123 4 - YOW 3 123 4 5 - YOW 4

stepl, for Half pyramid case we always use "row no. + 1"
formula, i.e.
inner 100p will always run
from 0 to row no. + 1.

Step 2, In each column, we're

printing column no. +1" st

number, i.e.,

col. 0 2 0 + 1 2 1 print

col. 1 2 1 + 1 2 2 print

col. 2 2 2 + 1 2 3 print

col. 3 2 3 + 1 2 4 print.

Date.....

code: - POPP FIRH DINGMUM BOTY SUNT #include (iostream) using namespace std; intimainu int rount; cout << "In enter rows 2"; cin >> rcount; forlint 820; 8 < 8 count; 8++) Enclotet of contract of 2 cout << c+1; 2 cout « end!; .9-1, 49 daysy 3 return o; triro D = 1+8 . 8 100

7 Inverted numeric Half Pyramid.

1 2 3 4 5 - YOWO 1 2 3 4 - YOW1 1 2 3 - YOW2 1 2 - YOW4

step 1, for inverted case, we always use "total rows - row no." formulae, i.e., inner 100p will always run from o to total row - row no.

Step 2, In each column, we are printing "column no. +1"st

col. 0 2 0 + 1 2 1 print col. 1 2 1 + 1 2 2 print col. 2 2 + 1 2 3 print col. 3 · 3 + 1 2 4 print col. 4 2 4 + 1 2 5 print

Date..... bimorus 1107 code:-#include (iostream) using namespace std;
int main ()

int \*count; cout << "enter row 2"; cin >> rcount; for (int r=0; r < rcount; £ 1000 positiving rott)

for line a series of 1) for (int c = 0; c < r count cout « end!; ; return o; Teacher's Sian