In [ ]:
```python
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```

In [6]:
```python
# Question 1: Write a program to print pallindromic pyramid

num = int(input("Enter a number: "))
print("Input: ", num)

print("Output:")
for i in range(1, num + 1):
    for s in range(1, num - i + 1):
        print(" ", end=" ")
    for j in range(1, i + 1):
        print(j, end=" ")

    for k in range(i - 1, 0, -1):
        print(k, end=" ")
    print()
```

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

In [7]:
```python
# Question 2: Write a program to print hollow diamond star pattern
num = int(input("enter a number: "))
print("Input: ", num)

print("Output:")

for i in range(1, num + 1):

    for s in range(1, num - i + 1):
        print(" ", end=" ")

    for j in range(1, i + 1):
        if j == 1:
            print("*", end=" ")
        else:
            print(" ", end=" ")
```

```python
        for k in range(2, i + 1):
            if k == i:
                print("*", end=" ")
            else:
                print(" ", end=" ")

        print()

for i in range(2, num + 1):

    for j in range(1, i + 1):
        if j == i:
            print("*", end=" ")
        else:
            print(" ", end=" ")

    for s in range(1, num - i + 1):
        print(" ", end=" ")

    for k in range(1, num):
        if k == num - i:
            print("*", end=" ")
        else:
            print(" ", end=" ")

    print()
```

```
Input:  5
Output:
        *
      *   *
    *       *
  *           *
*               *
  *           *
    *       *
      *   *
        *
```

In [8]:
```python
# 3. Write a program to print hollow diamond number pattern

num = int(input("Enter a number: "))
print("Input: ", num)

print("Output:")
```

```python
x = 3

for i in range(1, num + 1):

    for s in range(1, num - i + 1):
        print(" ", end=" ")

    for j in range(1, i + 1):
        if j == 1:
            print("1", end=" ")
        else:
            print(" ", end=" ")

    for k in range(2, i + 1):
        if k == i:
            print(x, end=" ")
            x = x + 2
        else:
            print(" ", end=" ")

    print()

x = x - 4

for i in range(2, num + 1):

    for j in range(1, i + 1):
        if j == i:
            print("1", end=" ")
        else:
            print(" ", end=" ")

    for s in range(1, num - i + 1):
        print(" ", end=" ")

    for k in range(1, num):
        if k == num - i:
            print(x, end=" ")
            x = x - 2
        else:
            print(" ", end=" ")

    print()
```

```
Input:  5
Output:
            1
        1   3
      1         5
    1             7
  1                 9
    1             7
      1         5
        1   3
            1
```

In [10…
```python
# Question 4:  Write a program to find all occurrences of substring
# Example- Given String- "Python programming is an interesting progr
#   substring= "program"
# Output- It should print positions of substring like 7, 37

str = input("Enter the main string: ")
sub_str = input("Enter the substring: ")
print("Input: ")
print(f"string: '{str}'")
print(f"substring: '{sub_str}'")

print("Output:")
start = 0
count = 0

occ = []

while True:
    start = str.find(sub_str, start)
    if start == -1:
        break
    occ.append(start)
    start += 1
    count += 1

print(f"Total occurrences of substring: {count}")
print(f"Found at {occ}")
if count == 0:
    print("Substring not found")
```

```
Input:
string: 'Python programming is an interesting programming language'
substring: 'program'
Output:
Total occurrences of substring: 2
Found at [7, 37]
```

In [15…
```python
# Question 5: Write a program to count and print the number of vowel
# special characters in a given text.

str = input("Enter a string: ")
print(f"Input: {str}")

print("Output:")
v = c = d = w = s = 0
l = 1

empt = True

for char in str:
    empt = False

    if ('A' <= char <= 'Z') or ('a' <= char <= 'z'):
        if char in 'aeiouAEIOU':
            v += 1
        else:
            c += 1

    elif '0' <= char <= '9':
        d += 1

    else:
        if char == ' ':
            w += 1
        elif char == '.':
            s += 1
            w += 1
        elif char == '\n':
            w += 1
            l += 1
        else:
            s += 1

if not empt:
    w += 1
else:
```

```
        l = w = 0

    print("Vowels:", v)
    print("Consonants:", c)
    print("Digits:", d)
    print("Words:", w)
    print("Special Chars:", s)
    print("Lines:", l)
```

```
Input: This is a sample string with special chars: 123!@#
Output:
Vowels: 11
Consonants: 24
Digits: 3
Words: 9
Special Chars: 4
Lines: 1
```

In [16…
```python
# 6. Write a Python program to find the longest word in a sentence.

str = input("Enter a string: ")
print("Input: ", str)

print("Output:")

words = str.split()

longest = ''

for word in words:
    if (len(word) > len(longest)):
        longest = word

print(f"Longest word is: {longest}")
```

```
Input:  find the longest word in the sentence
Output:
Longest word is: sentence
```

In [17…
```python
# 7. Write a Python program to replace all occurrences of a substrin
# Example- text = "I like apple, apple is my favorite fruit. apple p
# old_sub = "apple", new_sub = "orange"
# Output- "I like orange, orange is my favorite fruit. orange pie is

str = input("Enter a String: ")

old = input("Enter old subtring: ")
```

```python
new = input("Enter new subtring: ")

print("Input: ")
print(f"string: '{str}'")
print(f"old_sub: '{old}'")
print(f"new_sub: '{new}'")

print("Output:")
result = ''
i = 0
while i < len(str):
    if str[i : i + len(old)] == old:
        result += new
        i += len(old)

    else:
        result += str[i]
        i += 1

print(result)
```

```
Input:
string: 'I like to eat oranges.'
old_sub: 'orange'
new_sub: 'apple'
Output:
I like to eat apples.
```

In [19…
```python
# 8. Write a Python program to check if a string contains only uniqu

str = input("Enter a string")
print("Input: ", str)

print("Output:")
ditc = {}

isunique = True

for char in str:

    if ditc.get(char):
        isunique = False
        break

    ditc[char] = True
```

```
if (isunique):
    print("All characters in the string are unique")
else:
    print("Some characters in the string are repeating")
```

```
Input:  Are there any repeating characters in this string
Output:
Some characters in the string are repeating
```

In [ ]:
```python
# 9. Write a program to remove duplicates from array.

arr = []

while True:
    x = int(input("Enter a number: "))
    arr.append(x)

    s = input("Enter 'x' to stop taking inputs. Press any other key

    if s == 'x' or s == 'X':
        break

new_arr = []
for x in arr:
    if x not in new_arr:
        new_arr.append(x)

print(f"original array: {arr}")
print(f"remove duplicate: {new_arr}")
```

```
original array: [4, 2, 3, 1, 9, 9, 0, 5]
remove duplicate: [4, 2, 3, 1, 9, 0, 5]
```

In [21…
```python
# 10.Write a program to swap consecutive numbers in an array.

arr = []

num_of_ele = 10

print("Enter 10 numbers for the array")
for i in range(0, num_of_ele):
    x = int(input("Enter a number: "))
    arr.append(x)

print(f"Before Swap: {arr}")

index = 0
```

```python
    while index < num_of_ele:

        i1 = index
        i2 = index + 1

        temp = arr[i1]
        arr[i1] = arr[i2]
        arr[i2] = temp

        index += 2

    print(f"After Swap:  {arr}")
```

```
Enter 10 numbers for the array
Before Swap: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
After Swap:  [2, 1, 4, 3, 6, 5, 8, 7, 10, 9]
```

In [ ]: