```python
#que 1
num = int(input("Enter a number: "))
if num > 0:
    print("Positive")
elif num < 0:
    print("Negative")
else:
    print("Zero")


#Step 1: num = int(input("Enter a number: "))
#The user enters 5, so num becomes 5.

#Step 2: The program checks if num > 0.
#Since 5 > 0 is True, it enters the if block.

#Step 3: print("Positive")
#The output is: Positive.

#Step 4: The program skips the rest of the conditions because it already found a match.
```

```
Enter a number:  5
Positive
```

```python
#que 2
num = int(input("Enter a number: "))
if num % 2 == 0:
    print("Even Number")
else:
    print("Odd Number")

#Step 1: num = int(input("Enter a number: "))
#The user enters 7, so num becomes 7.

#Step 2: The program checks if num % 2 == 0.
#Since 7 % 2 == 1 (the remainder when dividing 7 by 2 is 1), the condition evaluates to False.

#Step 3: The program skips the if block and enters the else block.

#Step 4: The program executes print("Odd Number").

#Step 5: The output is:
```

```
Enter a number:  8
Even Number
```

```python
#que 3
age = int(input("Enter your age: "))
if age >= 18:
    print("You can vote")
else:
    print("You can not vote")

#1 The program asks the user to enter age.

#2 The user enters 16.

#3 The value 16 is stored in the variable age.

#4 The program checks the condition age >= 18.

#5 Since 16 >= 18 is False, it goes to the else part.

#6 It prints "You can not vote".
```

```
Enter your age:  19
You can vote
```

```python
#que 4
a = int(input("Enter first number : "))
b = int(input("Enter second number : "))
if a>b :
    print(f"Number, {a}, is larger")
elif b>a :
    print(f"Number {b} is larger")
else :
    print("both numbers are equal")

#The program asks the user to enter first number.
#User enters 7, so a = 7.

#The program asks the user to enter second number.
#User enters 5, so b = 5.

#The program checks the condition a > b → 7 > 5 -> True.

#Since the condition is True, it prints:
#"Number, 7, is Larger"

#elif and else blocks are skipped.
```

```
Enter first number :  7
Enter second number :  9
Number 9 is larger
```

```python
#que 5
a = int(input("Enter first number : "))
b = int(input("Enter second number : "))
c = int(input("Enter third number : "))
if a>b and c :
    print(f"Number {a} is larger")
elif b>a and c :
    print(f"Number {b} is larger")
elif c>a and b :
    print(f"Number {b} is larger")
else :
    print("All numbers are equal")

# User enters 10, so a = 10.

#User enters 7, so b = 7.

#User enters 5, so c = 5.

#Program checks a > b and a > c → 10 > 7 and 10 > 5 ->True.

#Prints: "Number 10 is larger"

#elif and else blocks are skipped.
```

```python
#que 6
ch = input("Enter a character: ").lower()
if ch in "aeiou":
    print("Vowel")
else:
    print("Consonant")

# The program asks user to enter a character.

#User enters A.

#.lower() converts it to lowercase → now ch = 'a'.

#Program checks: ch in "aeiou" → is 'a' in "aeiou"? - Yes.

#Prints: "Vowel".

#else block is skipped.
```

```
Enter a character:  h
Consonant
```

```python
#que 7
year = int(input("Enter a year: "))
if (year % 400 == 0) or (year % 4 == 0 and year % 100 != 0):
    print("Leap Year")
else:
    print("Not a Leap Year")

#Program asks user to enter a year.
#User enters 2024, so year = 2024.
#First condition is checked:
#(2024 % 400 == 0) or (2024 % 4 == 0 and 2024 % 100 != 0)
#2024 % 400 == 0 → 24 == 0 - False
#2024 % 4 == 0 → 0 == 0 - Tru
#2024 % 100 != 0 → 24 != 0 - True
#Combined result: False or (True and True) →  True
#Since condition is True → prints: "Leap Year"
#else block is skipped.
```

```
Enter a year:  2025
Not a Leap Year
```

```python
#que 8
num = int(input("Enter a number: "))
if num % 5 == 0 and num % 11 == 0:
    print("Multiple of 5 and 11")
else:
    print("Not a multiple of 5 and 11")


#User enters 50, so num = 50.

#Program checks condition:

#50 % 5 == 0 → - True

#50 % 11 == 0 → 50 % 11 = 6 - False

#Since and needs both True, overall condition - False

#Program goes to else block and prints: "Not a multiple of 5 and 11"
```

```
Enter a number:  55
Multiple of 5 and 11
```

```python
#que 9
marks = int(input("Enter marks: "))
if marks >= 90:
    print("Grade A")
elif marks >= 75:
    print("Grade B")
elif marks >= 50:
    print("Grade C")
else:
    print("Fail")

#Program asks user to enter marks.
#User enters 92, so marks = 92.
#Program checks marks >= 90 → 92 >= 90 - True.
#Since condition is True, it prints: "Grade A".
#All other elif and else blocks are skipped.
```

```
Enter marks:  92
Grade A
```

```python
#que 10
ch = input("Enter a character: ")
if ch.isupper():
    print("Uppercase")
elif ch.islower():
    print("Lowercase")
elif ch.isdigit():
    print("Digit")
else:
    print("Special character")

#Program asks user to enter a character.
#User enters G, so ch = 'G'.

#Checks ch.isupper() → 'G' is uppercase - True.

#Prints: "Uppercase"

#ALL elif and else blocks are skipped.
```

```
Enter a character:  (
Special character
```

```python
#que 11
for i in range(1, 101):
    if i % 3 == 0 and i % 5 != 0:
        print(i)

#The program uses a for loop to iterate i from 1 to 100 (inclusive).

#For each i, it checks the condition:

#i % 3 == 0 → number is divisible by 3

#i % 5 != 0 → number is not divisible by 5

#If the condition is True, it prints the number.
```

```
3
6
9
12
18
21
24
27
33
36
39
42
```

```python
#que 12
N = int(input("Enter N: "))
total = sum(i for i in range(1, N+1) if i % 2 == 0)
print("Sum of even numbers =", total)

#Input → 5)
#N = 5
#Numbers from 1 to 5 → 1, 2, 3, 4, 5
#Even numbers → 2, 4
#Sum → 2 + 4 = 6
#Output: 6
```

```
Enter N:  8
Sum of even numbers = 20
```

```python
#que 13
N = int(input("Enter N: "))
total = sum(i for i in range(1, N+1) if i % 2 != 0)
print("Sum of odd numbers =", total)
#Input → 5
#N = 5
#Numbers from 1 to 5 → 1, 2, 3, 4, 5
#Odd numbers → 1, 3, 5
#Sum → 1 + 3 + 5 = 9
#Output: 9
```

```
Enter N:  77
Sum of odd numbers = 1521
```

```
#que 14
num = int(input("Enter a number: "))
for i in range(1, 11):
    print(f"{num} x {i} = {num*i}")

#Dry run:
#i  Expression   Result   Output
#1  3 x 1          3       3 x 1 = 3
#2  3 x 2          6       3 x 2 = 6
#3  3 x 3          9       3 x 3 = 9
#4  3 x 4          12      3 x 4 = 12
#5  3 x 5          15      3 x 5 = 15
#6  3 x 6          18      3 x 6 = 18
#7  3 x 7          21      3 x 7 = 21
#8  3 x 8          24      3 x 8 = 24
#9  3 x 9          27      3 x 9 = 27
#10 3 x 10         30      3 x 10 = 30
```

```
Enter a number:  4
4 x 1 = 4
4 x 2 = 8
4 x 3 = 12
4 x 4 = 16
4 x 5 = 20
4 x 6 = 24
4 x 7 = 28
4 x 8 = 32
4 x 9 = 36
4 x 10 = 40
```

```python
#que 15
num = int(input("Enter a number: "))
if num > 1:
    for i in range(2, int(num**0.5)+1):
        if num % i == 0:
            print("Not Prime")
            break
        else:
            print("Prime")

#User enters 7 → num = 7

#Check num > 1 → 7 > 1 - True

#Loop: i goes from 2 to int(7**0.5)+1 = 3 (i.e., i = 2)

#i = 2 → 7 % 2 = 1 → Not divisible → continue loop

#Loop ends → else of loop executes → prints "Prime"
```

```python
#que 16
num = int(input("Enter a number: "))
fact = 1
for i in range(1, num+1):
    fact *= i
print("Factorial =", fact)


#num = 3, fact = 1

#i   fact before    Operation    fact after
#1       1             1*1           1
#2       1             1*2           2
#3       2             2*3           6

#Print: Factorial = 6
```

```
Enter a number:  6
Factorial = 720
```

```python
#que 17
num = int(input("Enter a number: "))
s = sum(int(d) for d in str(num))
print("Sum of digits =", s)

#User enters 123 → num = 123

#Convert number to string → str(num) = "123"

#Iterate over each character d in "123" and convert to integer:

#d = '1' → int(d) = 1

#d = '2' → int(d) = 2

#d = '3' → int(d) = 3

#Sum all digits: 1 + 2 + 3 = 6

#s = 6

#Print: 6
```

```
Enter a number:  654
Sum of digits = 15
```

```python
#que 18
num = input("Enter a number: ")
if num == num[::-1]:
    print("Palindrome")
else:
    print("Not Palindrome")

#User enters 454 → num = "454"

#Check num == num[::-1] → "454" == "454" - True

#Prints: palindrom
```

```
Enter a number:  racecar
Palindrome
```

```
#que 19
num = int(input("Enter a number: "))
power = len(str(num))
s = sum(int(d)**power for d in str(num))
print("Armstrong" if s == num else "Not Armstrong")

#User enters 123 → num = 123
#power = len(str(123)) = 3
#Compute sum of each digit raised to power 3:

#1^3 = 1
#2^3 = 8
#3^3 = 27
#Sum = 36
#Check s == num → 36 == 123 → False
#Print:
```

```
Enter a number:  23
Not Armstrong
```

```
#que 20
n = int(input("Enter number of terms: "))
a, b = 0, 1
for _ in range(n):
    print(a, end=" ")
    a, b = b, a+b
```

```
Enter number of terms:  10
0 1 1 2 3 5 8 13 21 34
```