100 Coding Challenges

1. Write a Python program that takes three ages as input and determines the oldest age among them.

Constraints:

- You cannot use built-in functions like max() or min().
- Assume the ages are integers and non-negative.

```
age1,age2,age3 = map(float, input("Enter the age: ").split())
if age1 >= age2 and age1 >= age3:
  print(f"{round(age1)} is the oldest age!")
elif age2 >= age1 and age2 >= age3:
  print(f"{round(age2)} is the oldest age!")
else:
  print(f"{round(age3)} is the oldest age!")
```

```
Enter the age: 56 98 55
98 is the oldest age!
```

2. Write a Python program that converts a temperature in Celsius to Fahrenheit.

```
celsius = float(input("Enter temperature in celcius: "))
fahrenheit = ( celsius * 9/5 ) + 32
print(f"The temperature in is {fahrenheit:.2f}")
```

```
Enter temperature in celcius: 75
The temperature in is 167.00
```

3. Write a Python program to swap two numbers entered by the user.

Constraints:

- Use arithmetic operations or a temporary variable to perform the swap.
- Avoid directly assigning values (e.g., a, b = b, a).

```
a,b = map(float, input("Enter two numbers: ").split())
print(f"values of a & b before swapping are {a} and {b} respectively.")
temp = a
a = b
b = temp
print(f"values of a & b after swapping are {a} and {b} respectively.")
```

```
Enter two numbers: 5.6 5.4
values of a & b before swapping are 5.6 and 5.4 respectively.
values of a & b after swapping are 5.4 and 5.6 respectively.
```

4. Write a Python program that calculates the sum of the digits of a three-digit number entered by the user.

Constraints:

- The input must be a three-digit number.
- Use mathematical operations (division and modulus) to extract each digit.

```
num = int(input("Enter a three digit number: "))
number = num
# 123
digit1 = number % 10   # 3
number = number // 10  # 12
digit2 = number % 10    # 2
digit3 = number // 10  # 1

sum = digit1 + digit2 + digit3
print(f"The sum of three digits is {sum}")
```

```
Enter a three digit number: 123
The sum of three digits is 6
```

5. Write a Python program that:

Reverses a four-digit number entered by the user. Checks whether the reversed number is the same as the original (palindrome check).

Constraints:

- The input must be a four-digit number.
- Use mathematical operations or string manipulation to reverse the number.

```
number = int(input("Enter a four digit number: "))
#1234  #4321 = 4 *1000 + 3*100 + 2*10 + 1
num = number
digit4 = num % 10  # 4
digit3 = (num // 10) % 10  # 3
digit2 = (num // 100) % 10 #2
digit1 = num //1000 # 1

reversed = digit4 *1000 + digit3*100 + digit2*10 + digit1
if reversed == number:
  print(f"The reversed number is {reversed}. This number is a palindrome number.")
else:
  print(f"The reversed number is {reversed}. This number is not a palindrome number.")
```

```
Enter a four digit number: 1221
The reversed number is 1221. This number is a palindrome number.
```

6. Write a Python program that checks whether a number entered by the user is odd or even.

Constraints:

- Input must be an integer.
- Use the modulus operator (%) to determine divisibility by 2.

```
def odd_even(num):
  if num % 2 == 0:
    return True
  else:
    return False

num = int(input("Enter the number you wants to check: "))
check = odd_even(num)
if check:
  print(f"Given number is a even number!")
else:
  print(f"Given number is an odd number!")
```

```
Enter the number you wants to check: 7
Given number is an odd number!
```

7. Write a Python program that checks whether a given year is a leap year or not.

Definition: A year is a leap year if:

- It is divisible by 4, and
- It is not divisible by 100, unless it is also divisible by 400.

```
def leap_year(year):
  if (year % 4 == 0 and year % 100 != 0)  or (year % 400 == 0):
    return True
  else:
    return False
year = int(input("Enter a year: "))
check = leap_year(year)
if check:
  print(f"Given year is a leap year!")
else:
  print(f"Given year is not a leap year!")
```

```
Enter a year: 2011
Given year is not a leap year!
```

8. Write a Python program to calculate the Euclidean distance between two points in a 2D space.

```
import math
def euclidean_distance(x1,y1,x2,y2):
```

```
  return  math.sqrt( (x2 - x1)**2 + (y2 - y1)**2 )

x1,y1 = map(float, input("Enter x1 & y1 co-ordinates for point_1: ").split())
x2,y2 = map(float, input("Enter x2 & y2 co-ordinates for point_2: ").split())

distance = euclidean_distance(x1,y1,x2,y2)
print(f"The Euclidean distance between ({x1,y1}) & ({x2,y2}) is {distance:.2f} cm")
```

9. Write a Python program that takes three angles as input and determines whether those angles can form a valid triangle.

Definition of a Triangle:

- A triangle is valid if the sum of its three interior angles is exactly 180°.
- Each angle should be a positive value greater than 0.

```
def is_triangle_valid(angle1, angle2, angle3):
  if ( angle1 + angle2 + angle3 == 180 ) and ( angle1 > 0 and angle2 > 0 and angle3 > 0):
    return True
  else:
    return False
angle1, angle2, angle3 = map(float, input("Enter three angles (space-seperated): ").split())
check = is_triangle_valid(angle1, angle2, angle3)
if check:
  print(f"Triangle is possible!")
else:
  print(f"Triangle is not possible!")
```

10. Write a program that will take user input of cost price and selling price and determines whether it's a loss or a profit

```
cost_price = float(input("Enter the cost price: "))
selling_price = float(input("Enter the selling price: "))

if cost_price > selling_price:
 amount = cost_price - selling_price
 print("Loss of ", amount)
else:
  amount = selling_price - cost_price
  print('Profit of ', amount)
```

11. Write a program to find the simple interest when the value of principle, rate of interest and time period is given

```
def simple_interest(p,r,t):
  si = p * (r/100) * t
  amount = p + si
  return si, amount
p,r,t = map(float, input("Enter principle amount, rate% & time period in years: ").split())

interest,total_amount = simple_interest(p,r,t)
print(f"Simple interest on principle amount of Rs. {p:.2f} is Rs. {interest:.2f} & total amount is Rs. {total_amount:.2f}")
```

12. Write a program to find the volume of the cylinder. Also find the cost when, the cost of 1litre milk is 40Rs.

```
def volume_and_cost_price(r,h):
    volume = math.pi * (r**2) * h
    cost_price = volume/1000 * 40
    return volume, cost_price
r,h = map(float, input("Enter radius and height of cylinder in cm: ").split())
vol, cost = volume_and_cost_price(r,h)
print(f"The volume of a cylinder is {vol:.2f} cm**3 and total cost is Rs. {cost}")
```

13. Write a program that will tell whether the given number is divisible by 3 &6.

```
def divisibility(number):
  if number % 3 == 0 and number % 5 == 0:
    return True
  else:
    return False
number = int(input("Enter the number: "))
check = divisibility(number)
if check:
```

```
  print(f"Number is divisible by 3 & 5.")
else:
  print(f"Number is not divisible by 3 & 5.")
```

14. Write a Python program that calculates the angle between the hour hand and the minute hand of a clock, based on the time entered by the user.

```
class solution:
  def find_angle(h,m):
    angle = abs( 30*H - (11/2)*M )
    angle = min(angle, 360 - angle)
    return int(angle)
instance = solution()
h, m = map(float, input("Enter hours and minutes: ").split())
print("The difference between hours hand & minute hand is ", instance.find_angle(h, m))
```

15. Write a program that will determine weather when the value of temperature and humidity is provided by the user.

- TEMPERATURE(C) HUMIDITY(%) WEATHER
- = 30 >=90 Hot and Humid
- = 30 < 90 Hot
- <30 >= 90 Cool and Humid
- <30 <90 Cool

```
temp, humidity = map(float, input("Enter the values of temperature in celcius and humidity in degree: ").split())
if temp = 30 and humidity >= 90:
  print(f"Hot and Humid")
elif temp = 30 and humidity < 90:
  print(f"Hot")
elif temp < 30 and humidity >= 90:
  print(f"Cool and Humid")
else:
  print(f"Cool")
```

16. Write a program that will take digits from three digit number from the user and add the square of each digit.

```
num = int(input("Enter a three digit number: "))
number = num
# 123
digit1 = number % 10   # 3
number = number // 10  # 12
digit2 = number % 10    # 2
digit3 = number // 10  # 1

sum = digit1**2 + digit2**2 + digit3**2
print(f"The sum of three squared digits is {sum}")
```

17. Write a program that will check whether the number is Armstrong number or not.

```
num = int(input("Enter a three digit number: "))
number = num
# 123
digit1 = number % 10   # 3
number = number // 10  # 12
digit2 = number % 10    # 2
digit3 = number // 10  # 1

sum = digit1**3 + digit2**3 + digit3**3
if sum == num:
   print(f"Armstrong Number!")
else:
   print(f"Not an Armstrong Number!")
```

18. Write a program that will take user input of (4 digits number) and check whether the number is narcissist number or not.

```
num = int(input("Enter a four digit number: "))
number = num
```

```
# 1234
digit4 = number % 10   # 4
digit3 = (number // 10) % 10  # 3
digit2 = (number// 100) % 10    # 2
digit1 = number // 1000  # 1

sum = digit1**4 + digit2**4 + digit3**4 + digit4**4
if sum == num:
   print(f"Narcissist Number!")
else:
   print(f"Not an Narcissist Number!")
```

19. Create a menu-driven program to manage a list of numbers. The program should allow the user to perform the following operations by choosing from a menu:

Add a number: Prompt the user to input a number and add it to the list. Remove a number: Prompt the user to input a number and remove it from the list if it exists. Display all numbers: Show all the numbers currently in the list. Find the maximum number: Display the largest number in the list. Find the minimum number: Display the smallest number in the list. Find the sum of numbers: Display the total sum of all numbers in the list. Exit the program: Terminate the program.

```
numbers = list()

def menu():
    print("\nMenu:")
    print("1. Add a number to the list")
    print("2. Remove a number from the list")
    print("3. Display all numbers in the list")
    print("4. Find the maximum number in the list")
    print("5. Find the minimum number in the list")
    print("6. Find the sum of all numbers in the list")
    print("7. Exit")

def add():
  num = int(input("Enter number to add: "))
  numbers.append(num)
  print(f"Number is added!")

def remove():
  num = int(input("Enter number to remove: "))
  if num in numbers:
    numbers.remove(num)
    print(f"Number is removed!")
  else:
    print(f"This number is not present!")

def display():
  if numbers:
    print(f"The list of numbers is: {numbers}")
  else:
    print(f"Sorry! List is empty.")

def max():
  if numbers:
    print(f"The maximum number is: {max(numbers)}")
  else:
    print(f"Sorry! List is empty.")

def min():
  if numbers:
    print(f"The minimum number is: {min(numbers)}")
  else:
    print(f"Sorry! List is empty.")

def min():
  if numbers:
    print(f"The sum of numbers from list is: {sum(numbers)}")
  else:
    print(f"Sorry, list is empty. Try adding some numbers first!")

while True:
  menu()
  choice = input("Enter your choice (1-7): ")
  if choice == "1":
    add()
  elif choice == "2":
    remove()
  elif choice == "3":
    display()
  elif choice == "4":
    max()
```

```
    max()
  elif choice == "5":
    min()
  elif choice == "6":
    sum()
  elif choice == "7":
    print("Exiting...")
    print("Thank you!")
    break
  else:
    print("Invalid choice. Please try again later!")
```

```
Menu:
1. Add a number to the list
2. Remove a number from the list
3. Display all numbers in the list
4. Find the maximum number in the list
5. Find the minimum number in the list
6. Find the sum of all numbers in the list
7. Exit
Enter your choice (1-7): 7
Exiting...
Thank you!
```

20. Write a program that will swap numbers

```
a,b = map(float,input("Enter your first and second number: ").split())
print(f"Before swapping numbers...")
print(f"your first number is {a}")
print(f"your second number is {b}")
a = a + b
b = a - b
a = a - b
print(f"After swapping numbers...")
print(f"your first number is {a}")
print(f"your second number is {b}")
```

```
Enter your first and second number: 1 2
Before swapping numbers...
your first number is 1.0
your second number is 2.0
After swapping numbers...
your first number is 2.0
your second number is 1.0
```

21. Write a program to find the sum of first n numbers, where n will be provided by the user. Eg if the user provides n=10 the output should be 55.

```
n = int(input("Enter the value of n: "))
sum = 0
for i in range(1,n+1,1):
  sum += i
print(f"The sum of first {n} numbers is {sum}")
```

```
Enter the value of n: 10
The sum of first 10 numbers is 55
```

22. Write a program that can multiply 2 numbers provided by the user without using the * operator

```
num1, num2 = map(int, input("Enter first & second numbers: ").split())
result = 0
for _ in range(num2):
  result += num1
print(f"The multiplication of {num1} and {num2} is {result}")
```

```
Enter first & second numbers: 5 5
The multiplication of 5 and 5 is 25
```

23. Write a program that can find the factorial of a given number provided by the user

```
def factorial(n):
  if n == 0 or n ==1:
    return 1
  else:
    return n * factorial(n -1)
```

```
n = int(input("Enter the value of n: "))
if n < 0:
  print(f"Factorial for negative numbers is not defined.")
else:
  result = factorial(n)
  print(f"The factorial of number {n} is {result}")
```

```
Enter the value of n: 3
The factorial of number 3 is 6
```

24. Write a program to print the first 25 odd numbers

```
count = 0
n = 1
while True:
  if n % 2 != 0:
    print(n)
    count = count + 1
  if count == 25:
    break
  n += 1
```

```
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
```

25. Print all the armstrong numbers in the range of 100 to 1000

```
for num in range(100,1000):
  a = num % 10
  b = (num //10) % 10
  c = num // 100
  if (a**3 + b**2 + c**3) == num:
    print(num)
```

```
135
175
407
```

26. Write a program to print all the unique combinations of 1,2,3 and 4

```
for i in range(1,5):
  for j in range(1,5):
    if i != j:
      print(i,j)
```

```
1 2
1 3
1 4
2 1
2 3
2 4
3 1
3 2
3 4
```

```
4 1
4 2
4 3
```