**PYTHON QUESTION BANK.**

**Q1) A dart board of radius 10 units & the wall it is hanging on are represented using a 2D co-ordinate system, with the boards center at coordinate (0,0). Variable x & y store the x-coordinate & the y-coordinate of a dart that hits the dashboard. Write a python expression using variable x & y that evaluates to true if the dart hits (is within) the drawable, and then evaluates the expression for these dart coordinate**

**a) (0,0)**

**b) (10,10)**

**c) (6,6)**

**d) (7,8)**

Ans: -

import math

def is\_in\_dartboard(x, y):

  """

  Checks if a dart hits the dartboard based on its coordinates.

  Args:

    x: The x-coordinate of the dart.

    y: The y-coordinate of the dart.

  Returns:

    True if the dart hits the dartboard, False otherwise.

  """

  distance\_from\_center = math.sqrt(x\*\*2 + y\*\*2)

  return distance\_from\_center <= 10

# Evaluate for the given coordinates

coordinates = [

  (0, 0),

  (10, 10),

  (6, 6),

  (7, 8),

]

for coord in coordinates:

  x, y = coord

  result = is\_in\_dartboard(x, y)

  print(f"Dart at ({x}, {y}) hits the dartboard: {result}")

o/p

Dart at (0, 0) hits the dartboard: True

Dart at (10, 10) hits the dartboard: False (outside the board)

Dart at (6, 6) hits the dartboard: True

Dart at (7, 8) hits the dartboard: False (outside the board)

**Q2) Write a program to implement a formula e = mc^2 states that the equivalent energy e can be calculated as a mass(m)\*the light's speed**

**c = about 3\*10^8**

**Write a python program to accept the mass of an object & determine its energy.**

Ans: -

# Speed of light in meters per second

speed\_of\_light = 3 \* 10\*\*8

def calculate\_energy(mass):

  """

  Calculates the energy equivalent of a mass using the formula e = mc^2.

  Args:

    mass: The mass of the object in kilograms.

  Returns:

    The energy equivalent of the mass in joules.

  """

  energy = mass \* speed\_of\_light\*\*2

  return energy

# Get mass from the user

mass = float(input("Enter the mass of the object in kilograms: "))

# Calculate and print the energy

energy = calculate\_energy(mass)

print(f"The energy equivalent of {mass} kg is {energy:.2e} joules.")

o/p: -

Enter the mass of the object in kilograms: 8

The energy equivalent of 8.0 kg is 7.20e+17 joules.

**Q3) Presume that a ladder is put upright a wall. Let variables length & angle store the length of the ladder & the angle that it forms with the ground as it leans against the wall. Write a python program to complete the height reached by the ladder on the wall for the following values of length & angle.**

**a) 16ft & 75**

**b) 20ft & 0**

**c) 24ft & 45**

**d) 24ft & 80**

**Ans: -**

import math

def calculate\_height(length, angle):

  """

  Calculates the height reached by a ladder on a wall given its length and angle.

  Args:

    length: The length of the ladder in feet.

    angle: The angle between the ladder and the ground in degrees.

  Returns:

    The height reached by the ladder on the wall in feet.

  """

  # Convert angle to radians

  angle\_radians = math.radians(angle)

  # Calculate height using sine function

  height = length \* math.sin(angle\_radians)

  # Round the height to two decimal places

  return round(height, 2)

# Calculate and print heights for different cases

print("a) 16ft & 75 degrees:")

height = calculate\_height(16, 75)

print(f"  Height reached: {height} feet")

print("b) 20ft & 0 degrees:")

height = calculate\_height(20, 0)

print(f"  Height reached: {height} feet")

print("c) 24ft & 45 degrees:")

height = calculate\_height(24, 45)

print(f"  Height reached: {height} feet")

print("d) 24ft & 80 degrees:")

height = calculate\_height(24, 80)

print(f"  Height reached: {height} feet")

**o/p: -**

a) 16ft & 75 degrees:

Height reached: 15.45 feet

b) 20ft & 0 degrees:

Height reached: 0.0 feet

c) 24ft & 45 degrees:

Height reached: 16.97 feet

d) 24ft & 80 degrees:

Height reached: 23.64 feet

**Q4) Explain Range function.**

**Ans: -** 1. The range() function in python is a powerful tool for generating sequences of number.

2. **Syntax: - range(start, stop, step).**

3. start (optional): The starting number of the sequence (inclusive). If omitted, defaults to 0.

stop (required): The number before which the sequence stops (exclusive).

step (optional): The increment between each number in the sequence. If omitted, defaults to 1.

4. Example: -

my\_range = range(10)  # start is 0 by default, stop is 10

for num in my\_range:

  print(num)

5. o/p: -

0

1

2

3

4

5

6

7

8

9

**Q5) What is an infinite loop? Give example.**

Ans: - An infinite loop, also known as an endless loop, is a sequence of instructions in a program that gets stuck repeating itself forever, unless stopped by external intervention. This typically happens because the program lacks a proper condition to break out of the loop, or the condition is never met due to an error.

Example: -

i = 0

while i < 10:

    print("Infinite loop")

**Q6) Write a python program that takes name & age as a input & display a message whether the user is eligible to apply for a driving license or not.(the eligible age is 18years and below 80 years).**

Ans:-

def check\_eligibility(name, age):

  """

  Checks if a user is eligible to apply for a driving license based on age.

  Args:

    name: The name of the user.

    age: The age of the user.

  Returns:

    A message indicating whether the user is eligible or not.

  """

  if age >= 18 and age < 80:

    return f"{name}, you are eligible to apply for a driving license."

  elif age < 18:

    years\_remaining = 18 - age

    return f"{name}, you are not eligible yet. You need to wait {years\_remaining} years to be eligible."

  else:

    return f"{name}, you are not eligible due to age restrictions."

name = input("Enter your name: ")

age = int(input("Enter your age: "))

message = check\_eligibility(name, age)

print(message)

o/p: -

Enter your name: Rodney

Enter your age: 20

Rodney, you are eligible to apply for a driving license.

**Q7) Write a python that prints Program the minimum & maximum of 5 numbers entered by the user. Without built-in function.**

Ans: -

# Define a list of numbers

numbers = []

# Get 5 numbers from the user

for i in range(5):

  number = int(input("Enter a number: "))

  numbers.append(number)

# Initialize minimum and maximum values

minimum = numbers[0]

maximum = numbers[0]

# Iterate through the list to find minimum and maximum

for number in numbers:

  if number < minimum:

    minimum = number

  if number > maximum:

    maximum = number

# Print the minimum and maximum values

print("Minimum:", minimum)

print("Maximum:", maximum)

o/p: -

Enter a number: 5

Enter a number: 3

Enter a number: 2

Enter a number: 7

Enter a number: 9

Minimum: 2

Maximum: 9

**Q8) xyz store plans to give a festival discount to its customer. The store Management has decided to give discount on the following criteria:**

**Shopping Amount Discount**

**>=500 and <1000 5%**

**>=1000 and <2000 8%**

**>=2000 10%**

**An Additional discount of 5% is given to customer who are the member of the store. Create a python program using user define function that accepts the shopping amount as a parameter & calculates discount % net**

**Net Payable Amount = Total Shopping Amount – Discount**

Ans: -

def calculate\_discount(amount, is\_member):

  """

  Calculates the discount based on shopping amount and membership status.

  Args:

    amount: The total shopping amount.

    is\_member: True if the customer is a member, False otherwise.

  Returns:

    A tuple containing the discount percentage and the net payable amount.

  """

  if amount >= 2000:

    discount\_percentage = 10

  elif amount >= 1000:

    discount\_percentage = 8

  elif amount >= 500:

    discount\_percentage = 5

  else:

    discount\_percentage = 0

  # Apply additional discount for members

  if is\_member:

    discount\_percentage += 5

  # Calculate net payable amount

  discount\_amount = amount \* discount\_percentage / 100

  net\_payable\_amount = amount - discount\_amount

  return discount\_percentage, net\_payable\_amount

def main():

  """

  Gets user input, calculates discount, and prints results.

  """

  shopping\_amount = float(input("Enter shopping amount: "))

  is\_member = input("Are you a member (y/n): ").lower() == "y"

  discount\_percentage, net\_payable\_amount = calculate\_discount(shopping\_amount, is\_member)

  print("Discount percentage:", discount\_percentage, "%")

  print("Net payable amount:", net\_payable\_amount)

if \_\_name\_\_ == "\_\_main\_\_":

  main()

o/p: -

Enter shopping amount: 3000

Are you a member (y/n): n

Discount percentage: 10 %

Net payable amount: 2700.0