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: -

```python
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: -

```python
# 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