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| **Question 1:** |
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| **Write a program that calculates and prints the value according to the given formula:** |
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| **Q = Square root of [(2 \* C \* D)/H]** |
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| **Following are the fixed values of C and H:** |
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| **C is 50. H is 30.** |
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| **D is the variable whose values should be input to your program in a comma-separated sequence.** |
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| **Example** |
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| **Let us assume the following comma separated input sequence is given to the program:** |
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| **100,150,180** |
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| **The output of the program should be:** |
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**18,22,24**

**Ans:**

import math

def calculate\_Q(D):

C = 50

H = 30

Q = int(math.sqrt((2 \* C \* D) / H))

return Q

input\_sequence = input("Enter comma-separated values of D: ")

values\_of\_D = [int(x) for x in input\_sequence.split(",")]

results = [calculate\_Q(D) for D in values\_of\_D]

result\_string = ",".join(map(str, results))

print("Output:", result\_string)

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| **Question 2:** |
| **Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i\*j.** | |
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| **Note: i=0,1.., X-1; j=0,1,¡­Y-1.** |
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| **Example** |
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| **Suppose the following inputs are given to the program:** |
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| **3,5** |
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| **Then, the output of the program should be:** |
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| **[[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]** |
| import math  def calculate\_Q(D):  C = 50  H = 30  Q = int(math.sqrt((2 \* C \* D) / H))  return Q  input\_sequence = input("Enter comma-separated values of D: ")  values\_of\_D = [int(x) for x in input\_sequence.split(",")]  results = [calculate\_Q(D) for D in values\_of\_D]  result\_string = ",".join(map(str, results))  print("Output:", result\_string) |
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**Question 3:**

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| **Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically.** |
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| **Suppose the following input is supplied to the program:** |
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| **without,hello,bag,world** |
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| **Then, the output should be:** |
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**bag,hello,without,world**

**Ans:**

input\_sequence = input("Enter comma-separated words: ")

words = input\_sequence.split(",")

words.sort()

sorted\_sequence = ",".join(words)

print("Sorted words:", sorted\_sequence)

**Question 4:**

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| **Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically.** |
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| **Suppose the following input is supplied to the program:** |
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| **hello world and practice makes perfect and hello world again** |
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| **Then, the output should be:** |
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**again and hello makes perfect practice world**

**Ans:**

input\_sequence = input("Enter whitespace-separated words: ")

words = input\_sequence.split()

unique\_words = list(set(words))

unique\_words.sort()

sorted\_sequence = " ".join(unique\_words)

print("Sorted and de-duplicated words:", sorted\_sequence)

**Question 5:**

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| **Write a program that accepts a sentence and calculate the number of letters and digits.** |
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| **Suppose the following input is supplied to the program:** |
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| --- |
| **hello world! 123** |
|  |

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| **Then, the output should be:** |
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| **LETTERS 10** |
|  |

**DIGITS 3**

**Ans:**

input\_sentence = input("Enter a sentence: ")

letters = sum(c.isalpha() for c in input\_sentence)

digits = sum(c.isdigit() for c in input\_sentence)

print("LETTERS", letters)

print("DIGITS", digits)

**Question 6:**

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| **A website requires the users to input username and password to register. Write a program to check the validity of password input by users.** |
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| **Following are the criteria for checking the password:** |
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| **1. At least 1 letter between [a-z]** |
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| **2. At least 1 number between [0-9]** |
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|  |
| --- |
| **1. At least 1 letter between [A-Z]** |
|  |

|  |
| --- |
| **3. At least 1 character from [$#@]** |
|  |

|  |
| --- |
| **4. Minimum length of transaction password: 6** |
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| --- |
| **5. Maximum length of transaction password: 12** |
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| **Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.** |
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| **Example** |
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| **If the following passwords are given as input to the program:** |
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| **ABd1234@1,a F1#,2w3E\*,2We3345** |
|  |

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| **Then, the output of the program should be:** |
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**ABd1234@1**

**Ans:**

import re

def is\_valid\_password(password):

# Define regular expressions for the criteria

has\_lower = bool(re.search(r'[a-z]', password))

has\_upper = bool(re.search(r'[A-Z]', password))

has\_digit = bool(re.search(r'[0-9]', password))

has\_special = bool(re.search(r'[$#@]', password))

length\_valid = 6 <= len(password) <= 12

return has\_lower and has\_upper and has\_digit and has\_special and length\_valid

input\_passwords = input("Enter comma-separated passwords: ")

passwords = input\_passwords.split(",")

valid\_passwords = [password for password in passwords if is\_valid\_password(password)]

valid\_passwords\_string = ",".join(valid\_passwords)

print("Valid passwords:", valid\_passwords\_string)