Day-1 Assignment

Assignment 1:

Jack and his three friends have decided to go for a trip by sharing the expenses of the fuel equally.

Write a Python program to calculate the amount (in Rs) each of them need to put in for the complete (both to and fro) journey.
The program should also display True, if the amount to be paid by each person is divisible by 5, otherwise it should display False. (**Hint**: Use the relational operators in print statement.)

Assume that mileage of the vehicle, amount per litre of fuel and distance for one way are given.

Test your code by using the given sample inputs.
Verify your code by using the **2nd** sample input(highlighted) given below:

Sample Input			**Expected Output**
Mileage of the vehicle (km/litre of fuel)	Amount per litre of fuel (Rs)	Distance for one way (kms)	
12	65	96	260.0 True
12	40	190	

Assignment 2:

Write a Python program to calculate and display the interest on a loan amount (Rupees) using the formula:

interest=(principal * rate of interest * time)/100

Test your code by using the given sample inputs.
Verify your code by using the **2nd** sample input(highlighted) given below:

Sample Input			Expected Output
Principal	Rate of Interest	Time	
20000	5	10	10000.0
7800	7.7	26	

Day-2 Assignment

Assignment 3:

Write a python program to find and display the product of three positive integer values based on the rule mentioned below:

It should display the product of the three values except when one of the integer value is 7. In that case, 7 should not be included in the product and the values to its left also should not be included.
If there is only one value to be considered, display that value itself. If no values can be included in the product, display -1.

Note: Assume that if 7 is one of the positive integer values, then it will occur only once. Refer the sample I/O given below.

Sample Input	Expected Output
1, 5, 3	15
3, 7, 8	8
7, 4, 3	12
1, 5, 7	-1

Assignment 4:

You have x no. of 5 rupee coins and y no. of 1 rupee coins. You want to purchase an item for amount z. The shopkeeper wants you to provide exact change. You want to pay using minimum number of coins. How many 5 rupee coins and 1 rupee coins will you use? If exact change is not possible then display -1.

Sample Input			Expected Output	
Available Rs. 1 coins	**Available Rs. 5 notes**	**Amount to be made**	**Rs. 1 coins needed**	**Rs. 5 notes needed**
2	4	21	1	4
11	2	11	1	2
3	3	19	-1	

Assignment 5:

An organization has decided to provide salary hike to its employees based on their job level. Employees can be in job levels 3 , 4 or 5.
Hike percentage based on job levels are given below:

Job level	Hike Percentage (applicable on current salary)
3	15
4	7
5	5

In case of invalid job level, consider hike percentage to be 0.

Given the current salary and job level, write a python program to find and display the new salary of an employee. Identify the test data and use it to test the program.

Assignment 6:
A traveler on a visit to India is in need of some Indian Rupees (INR) but he has money belonging to another currency. He wants to know how much money he should provide in the currency he has, to get the specified amount in INR.

Write a python program to implement a currency calculator which accepts the amount needed in INR and the name of the currency which the traveler has. The program should identify and display the amount the traveler should provide in the currency he has, to get the specified amount in INR.

Note: Use the forex information provided in the table below for the calculation. Consider that only the currency names mentioned in the table are valid. For any invalid currency name, display -1.

Currency	Equivalent of 1.00 INR
Euro	0.01417
British Pound	0.0100
Australian Dollar	0.02140
Canadian Dollar	0.02027

Also identify the test data and use it to test the program.

Assignment 7:

FoodCorner home delivers vegetarian and non-vegetarian combos to its customer based on order.

A vegetarian combo costs Rs.120 per plate and a non-vegetarian combo costs Rs.150 per plate. Their non-veg combo is really famous that they get more orders for their non-vegetarian combo than the vegetarian combo.

Apart from the cost per plate of food, customers are also charged for home delivery based on the distance in kms from the restaurant to the delivery point. The delivery charges are as mentioned below:

Distance in kms	Delivery charge in Rs per km
For first 3kms	0
For next 3kms	3
For the remaining	6

Given the type of food, quantity (no. of plates) and the distance in kms from the restaurant to the delivery point, write a python program to calculate the final bill amount to be paid by a customer.

The below information must be used to check the validity of the data provided by the customer:

- Type of food must be 'V' for vegetarian and 'N' for non-vegetarian.
- Distance in kms must be greater than 0.
- Quantity ordered should be minimum 1.

If any of the input is invalid, the bill amount should be considered as -1.

Assignment 8:

The Metro Bank provides various types of loans such as car loans, business loans and house loans to its account holders. Write a python program to implement the following requirements:

- Initialize the following variables with appropriate input values:account_number, account_balance, salary, loan_type, loan_amount_expected and customer_emi_expected.
- The account number should be of 4 digits and its first digit should be 1.
- The customer should have a minimum balance of Rupees 1 Lakh in the account.
- If the above rules are valid, determine the eligible loan amount and the EMI that the bank can provide to its customers based on their salary and the loan type they expect to avail.
- The bank would provide the loan, only if the loan amount and the number of EMI's requested by the customer is less than or equal to the loan amount and the number of EMI's decided by the bank respectively.

Display appropriate error messages for all invalid data. If all the business rules are satisfied ,then display account number, eligible and requested loan amount and EMI's.
Test your code by providing different values for the input variables.

Salary	Loan type	Eligible loan amount	No. of EMI's required to repay
> 25000	Car	500000	36
> 50000	House	6000000	60
> 75000	Business	7500000	84

Assignment 9:

Write a python program to generate and display the next date of a given date.

Assume that

- Date is provided as day, month and year as shown in below table.
- The input provided is always valid. Output should be day-month-year.
  Hint: print(day,"-",month,"-",year) will display day-month-year

	Sample Input	**Expected Output**
Day	1	2-9-2015
Month	9	
Year	2015	

Also identify the test data and use it to test the program.

Day-3 Assignment

Assignment 10:

Write a Python program to generate the next 15 leap years starting from a given year. Populate the leap years into a list and display the list.

Assignment 11:

ARS Gems Store sells different varieties of gems to its customers.

Write a Python program to calculate the bill amount to be paid by a customer based on the list of gems and quantity purchased. Any purchase with a total bill amount above Rs.30000 is entitled for 5% discount. If any gem required by the customer is not available in the store, then consider total bill amount to be -1.

Assume that quantity required by the customer for any gem will always be greater than 0.

Perform case-sensitive comparison wherever applicable.

Assignment 12:

Write a python function to check whether three given numbers can form the sides of a triangle.
Hint
: Three numbers can be the sides of a triangle if none of the numbers are greater than or equal to the sum of the other two numbers.

Assignment 13:

The program provided in the starter code tab is written to display "*" as per the expected output given below. But the code is having logical errors, debug the program using Eclipse Debugger and correct it.

Expected Output:

```
*****
****
***
**
*
```

Assignment 14:

Write a python program to solve a classic ancient Chinese puzzle.
We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?

Sample Input	Expected Output
heads-150 legs-400	100 50
heads-3 legs-11	No solution
heads-3 legs-12	0 3
heads-5 legs-10	5 0

Assignment 15:

Write a python program which finds the maximum number from num1 to num2 (num2 inclusive) based on the following rules.

1. Always num1 should be less than num2
2. Consider each number from num1 to num2 (num2 inclusive). Populate the number into a list, if the below conditions are satisfied

a. Sum of the digits of the number is a multiple of 3
b. Number has only two digits
c. Number is a multiple of 5

3. Display the maximum element from the list

In case of any invalid data or if the list is empty, display -1.

Day-4 Assignment

Assignment 16:

The road transport corporation (RTC) of a city wants to know whether a particular bus-route is running on profit or loss.

Assume that the following information are given:
Price per litre of fuel = 70
Mileage of the bus in km/litre of fuel = 10
Price(Rs) per ticket = 80

The bus runs on multiple routes having different distance in kms and number of passengers.
Write a function to calculate and return the profit earned (Rs) in each route. Return -1 in case of loss.

Assignment 17:

Given a string containing uppercase characters (A-Z), compress the string using Run Length encoding. Repetition of character has to be replaced by storing the length of that run.

Write a python function which performs the run length encoding for a given String and returns the run length encoded String.

Provide different String values and test your program.

Sample Input	Expected Output
AAAABBBBCCCCCCCC	4A4B8C
AABCCA	2A1B2C1A

Assignment 18:

Write a function, **check_palindrome()** to check whether the given string is a palindrome or not. The function should return true if it is a palindrome else it should return false.

Note: Initialize the string with various values and test your program. Assume that all the letters in the given string are all of the same case. Example: MAN, civic, WOW etc.

Assignment 19:

Care hospital wants to know the medical speciality visited by the maximum number of patients. Assume that the patient id of the patient along with the medical speciality visited by the patient is stored in a list. The details of the medical specialities are stored in a dictionary as follows:

```
{
"P":"Pediatrics",
"O":"Orthopedics",
"E":"ENT
}
```

Write a function to find the medical speciality visited by the maximum number of patients and return the name of the speciality.
Also write the pytest test cases to test the program.

Note:

1. Assume that there is always only one medical speciality which is visited by maximum number of patients.
2. Perform case sensitive string comparison wherever necessary.

Sample Input	Expected Output
[101,P,102,O,302,P,305,P]	Pediatrics
[101,O,102,O,302,P,305,E,401,O,656,O]	Orthopedics
[101,O,102,E,302,P,305,P,401,E,656,O,987,E]	ENT

Assignment 20:

Write a python program to display all the common characters between two strings. Return -1 if there are no matching characters.
Note: Ignore blank spaces if there are any. Perform case sensitive string comparison wherever necessary.

Sample Input	Expected output
"I like Python" "Java is a very popular language"	lieyon

Day-5 Assignment

Assignment 21:

Write a python function, **find_pairs_of_numbers()** which accepts a list of positive integers with no repetitions and returns count of pairs of numbers in the list that adds up to n. The function should return 0, if no such pairs are found in the list.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
[1, 2, 7, 4, 5, 6, 0, 3], 6	3
[3, 4, 1, 8, 5, 9, 0, 6], 9	4

Assignment 22:

A teacher is in the process of generating few reports based on the marks scored by the students of her class in a project based assessment.
Assume that the marks of her 10 students are available in a tuple. The marks are out of 25.

Write a python program to implement the following functions:

1. **find_more_than_average()**: Find and return the percentage of students who have scored more than the average mark of the class.
2. **generate_frequency()**: Find how many students have scored the same marks. For example, how many have scored 0, how many have scored 1, how many have scored 3....how many have scored 25. The result should be populated in a list and returned.
3. **sort_marks()**: Sort the marks in the increasing order from 0 to 25. The sorted values should be populated in a list and returned.

Sample Input	Expected Output
list_of_marks = (12,18,25,24,2,5,18,20,20,21)	70.0 [0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 2, 0, 2, 1, 0, 0, 1, 1] [2, 5, 12, 18, 18, 20, 20, 21, 24, 25]

Assignment 23:

Write a python function, **create_largest_number()**, which accepts a list of numbers and returns the largest number possible by concatenating the list of numbers.

Note: Assume that all the numbers are two digit numbers.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
23,34,55	553423

Assignment 24:

A teacher is conducting a camp for a group of five children. Based on their performance and behavior during the camp, the teacher rewards them with chocolates.

Write a Python function to

1. Find the total number of chocolates received by all the children put together.
   Assume that each child is identified by an id and it is stored in a tuple and the number of chocolates given to each child is stored in a list.
2. The teacher also rewards a child with few extra chocolates for his/her best conduct during the camp.
   - If the number of extra chocolates is less than 1, an error message "Extra chocolates is less than 1", should be displayed.
   - If the given child Id is invalid, an error message "Child id is invalid" should be displayed. Otherwise, the extra chocolates provided for the child must be added to his/her existing number of chocolates and display the list containing the total number of chocolates received by each child.

Assignment 25:

Write a python function, **check_double(number)** which accepts a whole number and returns True if it satisfies the given conditions.

1. The number and its double should have exactly the same number of digits.
2. Both the numbers should have the same digits ,but in different order.

Otherwise it should return False.

Example: If the number is 125874 and its double, 251748, contain exactly the same digits, but in a different order.

Assignment 26:

A vendor at a food court is in the process of automating his order management system.
The vendor serves the following menu – Veg Roll, Noodles, Fried Rice and Soup and also maintains the quantity available for each item. The customer can order any combination of items. The customer is provided the item if the requested quantity of item is available with the vendor.

Write a python program which implements the following functions.
place_order(*item_tuple): This function accepts the order placed by the customer. Consider it to be a variable length argument as each customer may have a different order.
The function should check whether the items requested are present in the vendor's menu and if so, it should check whether the requested quantity is available for each by invoking the check_quantity_available() method.

The function should display appropriate messages for each item in the order for the below scenarios:

1. When the requested item is not available in vendor's menu, display <Item Name> is not available
2. When the quantity requested by the customer is not available, display <Item Name> stock is over
3. When the requested quantity of the item is available with the vendor, display <Item Name> is available

check_quantity_available(index,quantity_requested): This function should check whether the requested quantity of the specified item is available. If so, it should reduce the quantity requested from the quantity available for that item and return True. Otherwise, it should return False.

Test your code by using the given sample inputs.
Verify your code by using the **2nd** sample input(highlighted) given below:

Sample Input		Expected Output
Menu and quantity available	**Items Ordered**	
(Veg Roll, Noodles, Fried Rice , Soup) [2,200,250,3]	Veg Roll,2 Noodles,2	Veg Roll is available Noodles is available
(Veg Roll, Noodles, Fried Rice , Soup) [2,200,3,0]	Fried Rice,2 Soup,1	

Day-6 Assignment

Assignment 27:

Write a recursive function, **is_palindrome()** to find out whether a string is a palindrome or not. The function should return true, if it is a palindrome. Else it should return false.

Note- Perform case insensitive operations wherever necessary.

Also write the pytest test cases to test the program.

Assignment 28:

A 10-substring of a number is a substring of its digits that sum up to 10.

For example, the 10-substrings of the number 3523014 are:
3523014, 3**523**014, 3**5230**14, 35**23014**

Write a python function, **find_ten_substring(num_str)** which accepts a string and returns the list of 10-substrings of that string.

Handle the possible errors in the code written inside the function.

Sample Input	Expected Output
'3523014'	['5230', '23014', '523', '352']

Assignment 29:

Given a number n, write a program to find the sum of the largest prime factors of each of nine consecutive numbers starting from n.
g(n) = f(n) + f(n+1) + f(n+2) + f(n+3) + f(n+4) + f(n+5) + f(n+6) + f(n+7) + f(n+8)
where, g(n) is the sum and f(n) is the largest prime factor of n

For example,
g(10)=f(10)+f(11)+f(12)+f(13)+f(14)+f(15)+f(16)+f(17)+f(18)
=5 + 11 + 3 + 13 + 7 + 5 + 2 + 17 + 3
=66

Assignment 30:

Write a python function **find_smallest_number()** which accepts a number n and returns the smallest number having n divisors.
Handle the possible errors in the code written inside the function.

Sample Input	Expected Output
16	120

Assignment 31:

Write a python function **find_duplicates()**, which accepts a list of numbers and returns another list containing all the duplicate values in the input list. If there are no duplicate values, it should return an empty list.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
[12,54,68,759,24,15,12,68,987,758,25,69]	[12, 68]

Assignment 32:

The below function is written to check whether a given three digit number is an Armstrong number.

Hint: An "Armstrong number" is an n-digit number that is equal to the sum of the nth powers of its individual digits.
Example: 371 is an Armstrong number as 371 = 3^3 +7^3+ 1^3

But the function is having errors/bugs, debug the program using the Eclipse debugger and correct it.

Day-7 Assignment

Assignment 33:

Write a python function, **nearest_palindrome()** which accepts a number and returns the nearest palindrome greater than the given number.
Also write the pytest test cases to test the program.

Sample Input	Expected Output
12300	12321
12331	12421

Assignment 34:

Write a python function, **encrypt_sentence()** which accepts a message and encrypts it based on rules given below and returns the encrypted message.

Words at odd position -> Reverse It
Words at even position -> Rearrange the characters so that all consonants appear before the vowels and their order should not change

Note:

1. Assume that the sentence would begin with a word and there will be only a single space between the words.
2. Perform case sensitive string operations wherever necessary.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
the sun rises in the east	eht snu sesir ni eht stea

Assignment 35:

Write a python function, **find_correct()** which accepts a dictionary and returns a list as per the rules mentioned below. The input dictionary will contain correct spelling of a word as key and the spelling provided by a contestant as the value.

The function should identify the degree of correctness as mentioned below:
CORRECT, if it is an exact match

ALMOST CORRECT, if no more than 2 letters are wrong
WRONG, if more than 2 letters are wrong or if length (correct spelling versus spelling given by contestant) mismatches.

and return a list containing the number of CORRECT answers, number of ALMOST CORRECT answers and number of WRONG answers.
Assume that the words contain only uppercase letters and the maximum word length is 10.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
{"THEIR": "THEIR", "BUSINESS": "BISINESS","WINDOWS":"WINDMILL","WERE":"WEAR","SAMPLE":"SAMPLE"}	[2, 2, 1]

Assignment 36:

In a fair coin we have an equal chance (50%) of either getting a 'head' or 'tail'. That is if we toss the coin a large number of times we would observe head approximately 50% of the time. Write a program to implement a biased coin toss where the chance of getting a head is 70% (and tail 30%). That is if we invoke the program 1000 times we should see the head randomly approximately 700 times.

Assignment 37:

Write python function, **sms_encoding()** which accepts a sentence and converts it into an abbreviated sentence to be sent as SMS and returns the abbreviated sentence.

Rules are as follows:
a. Spaces are to be retained as is
b. Each word should be encoded separately

- If a word has only vowels then retain the word as is
- If a word has a consonant (at least 1) then retain only those consonants

Note: Assume that the sentence would begin with a word and there will be only a single space between the words.

Sample Input	Expected Output
I love Python	I lv Pythn
MSD says I love cricket and tennis too	MSD sys I lv crckt nd tnns t
I will not repeat mistakes	I wll nt rpt mstks

Day-8 Assignment

Assignment 38:

Consider sample data as follows: sample_data=range(1,11)

Create two functions: **odd() and even()**
The function even() returns a list of all the even numbers from sample_data
The function odd() returns a list of all the odd numbers from sample_data

Create a function sum_of_numbers() which will accept the sample data and/or a function.
If a function is not passed, the sum_of_numbers() should return the sum of all the numbers from sample_data
If a function is passed, the sum_of_numbers() should return the sum of numbers returned from the function passed.

Assignment 39:

Assume that a poem is given. Write the regular expressions for the following:

1. Print how many times the letter 'v' appears in the poem.
2. Remove all the newlines from the poem and print the poem in a single line.
3. If a word has 'ch' or 'co', replace it with 'Ch' or 'Co'.
4. If the pattern has characters 'ai' or 'hi', replace the next three characters with **.

Test your code by using the given sample inputs.
Verify your code by using the **2nd** sample input(highlighted) given below:

Sample Input	**Expected Output**
If I can stop one heart from breaking, I shall not live in vain; If I can ease one life the aching, Or cool one pain, Or help one fainting robin Unto his nest again, I shall not live in vain.	4 If I can stop one heart from breaking, I shall not live in vain; If I can ease one life the aching, Or cool one pain, Or help one fainting robin Unto his nest again, I shall not live in vain. If I can stop one heart from breaking, I shall not live in vain; If I can ease one life the aChing, Or Cool one pain, Or help one fainting robin Unto his nest again, I shall not live in vain. If I can stop one heart from breaking, I shall not live in vain; If I can ease one life the achi** Or cool one pain, Or help one fai**ng robin Unto hi**est again, I shall not live in vain.
It takes strength for being certain, It takes courage to have doubt. It takes strength for challenging alone, It takes courage to lean on another. It takes strength for loving other souls, It takes courage to be loved. It takes strength for hiding our own pain, It takes courage to help if it is paining for someone.	

Assignment 40:

Write a python function, **check_anagram()** which accepts two strings and returns True, if one string is an anagram of another string. Otherwise returns False.

The two strings are considered to be an anagram if they contain repeating characters but none of the characters repeat at the same position. The length of the strings should be the same.

Also write the pytest test cases to test the program.

Note: Perform case insensitive comparison wherever applicable.

Sample Input	**Expected Output**
eat, tea	True
backward,drawback	False (Reason: character 'a' repeats at position 6, not an anagram)
Reductions,discounter	True
About, table	False

Assignment 41:

Write a python program that accepts a text and displays a string which contains the word with the largest frequency in the text and the frequency itself separated by a space.

Rules:

1. The word should have the largest frequency.
2. In case multiple words have the same frequency, then choose the word that has the maximum length.

Assumptions:

1. The text has no special characters other than space.
2. The text would begin with a word and there will be only a single space between the words.

Perform case insensitive string comparisons wherever necessary.

Sample Input	Expected Output
"Work like you do not need money love like you have never been hurt and dance like no one is watching"	like 3
"Courage is not the absence of fear but rather the judgement that something else is more important than fear"	fear 2

Assignment 42:

The number, 197, is called a circular prime because all rotations of the digits: 197, 971, and 719, are themselves prime.

There are thirteen such primes below 100: 2, 3, 5, 7, 11, 13, 17, 31, 37, 71, 73, 79, and 97.

Write a python program to find and display the number of circular primes less than the given limit.

Day-9 Assignment

Assignment 43:

Write a python function to check whether the given number is a perfect number or not. The function should returns true if the number is a perfect number, else it should returns false.

Hint: Perfect number is a positive whole number that is equal to the sum of its proper divisors.
The first perfect number is 6 as the sum of its proper positive divisors, 1,2 and 3 is 6. Other perfect numbers are 28, 496, 8128 …

Extend the program written for the above problem to write another function to find all perfect numbers in a given list of numbers. Populate the perfect numbers in a list and return the list. If no perfect numbers found, return an empty list.

Note- Reuse the code wherever possible.

Assignment 44:

Write a python function, **remove_duplicates()** which accepts a string and removes all duplicate characters from the given string and return it.

Also write the pytest test cases to test the program.

Sample Input	Expected Output
1122334455ababzzz@@@123#*#*	12345abz@#*

Assignment 45:

Write a python program to validate the details provided by a user as part of registering to a web application.

Write a function validate_name(name) to validate the user name
Name should not be empty, name should not exceed 15 characters
Name should contain only alphabets

Write a function validate_phone_no(phoneno) to validate the phone number
Phone number should have 10 digits
Phone number should not have any characters or special characters
All the digits of the phone number should not be same.
Example: 9999999999 is not a valid phone number

Write a function validate_email_id(email_id) to validate email Id
It should contain one '@' character and '.com'
'.com' should be present at the end of the email id.
Domain name should be either 'gmail', 'yahoo' or 'hotmail'
Note: Consider the format of email id to be username@domain_name.com

All the functions should return true if the corresponding value is valid. Otherwise, it should return false.

Write a function validate all(name,phone no,email id) which should invoke appropriate functions to validate the arguments passed to it and display appropriate message. Refer the comments provided in the code.

Note: You may use str.isalpha(), str.isdigit() methods to check whether a string contains alphabets or digits alone.