

Lab Cycle 2

1. The flight ticket rates for a round-trip (Mumbai->Dubai) were as follows:
Rate per Adult: Rs. 37550.0
Rate per Child: 1/3rd of the rate per adult
Service Tax: 7% of the ticket amount (including all passengers)
As it was a holiday season, the airline also offered 10% discount on the final ticket cost (after inclusion of the service tax).
Find and display the total ticket cost for a group which had adults and children.

Test the program with different input values for number of adults and children.

Sample Input		Expected Output
Number of adults	Number of children	
5	2	Total Ticket Cost: 204910.35
3	1	Total Ticket Cost: 120535.5

2. 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

3.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	

4.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

5. 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.

6. Given a list of integer values. Write a python program to check whether it contains same number in adjacent position. Display the count of such adjacent occurrences

Sample Input	Expected Output
[1,1,5,100,-20,-20,6,0,0]	3
[10,20,30,40,30,20]	0
[1,2,2,3,4,4,4,10]	3

7. Write a python program which displays the count of the names that matches a given pattern from a list of names provided.

Consider the pattern characters to be:

1. "_ at" where "_" can be one occurrence of any character
2. "%at%" where "%" can have zero or any number of occurrences of a character

Sample Input	Expected Output
[Hat, Cat, Rabbit, Matter]	_at -> 2 %at% -> 3

8. 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.

9. 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.

Sample Input	Expected Output
23,34,55	553423

10. 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

11. Represent a small bilingual (English-Swedish) glossary given below as a Python dictionary

```
{"merry": "god", "Christmas": "jul", "and": "och", "happy": "gott", "new": "nytt", "year": "ar"}
```

and use it to translate your Christmas wishes from English into Swedish.

That is, write a python function `translate()` that accepts the bilingual dictionary and a list of English words (your Christmas wish) and returns a list of equivalent Swedish words.

12. We have 'N' flavors of toppings that can be added to a coffee. For example chocolate, hazelnut, vanilla, Irish and so on.

Write a function that takes the number of available flavors as input and returns the total number of different ways we can have our coffee. Note that we can have coffee without any toppings or with different combination of toppings.

13. 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

14. 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.

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

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

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

Write a function to find the medical specialty visited by the maximum number of patients and return the name of the specialty.

Note:

1. Assume that there is always only one medical specialty 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

16. 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 it 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

17. 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

18. Write a Python function **check_amicable_numbers(num1, num2)** that accepts two numbers num1 and num2 as arguments and returns True if the given pair of numbers are amicable numbers else return false. Invoke the function and based on return value print the numbers are amicable numbers or not.

num1 and num2 are said to be amicable numbers if sum of all the proper divisors (except num1 itself) of num1 is equal to num2 and sum of all the proper divisors of num2 (except num1 itself) is equal to num1.

Example: 220 and 284 are amicable numbers as

Proper divisors of 220 are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110 whose sum is 284

Proper divisors of 284 are 1, 2, 4, 71, 142 whose sum is 220