MS RAMAIAH INSTITUTE OF TECNOLOGY

Department of Information Science and Engineering

IS545L, Scripting Languages(0:0:1:0) – Term 28 Aug to 20 Dec 2017 Sem 5

PART A: Simple Python Programs and JavaScript for Client Side Scripting

1. Create a HTML Form that has two text boxes to enter numbers. Have two buttons 'Add' and 'Multiply'. Display the result (addition or multiplication) of these two numbers depending on the buttons clicked. Ensure the values in the text box is always positive not null numbers. Use Javascript for this client side scripting. Display appropriate error texts.
2. Write a python program to read in a list of elements. Create a new list that holds all the elements minus the duplicates (Use functions).
3. Write a python program to count the frequency of words in a given file.
4. Create a HTML form that will accept the marks of two subjects. The marks have to be a value between 0 to 100. The moment the mark is entered, display the grade obtained on the right side of the text-box. Also display the total marks obtained out of 200. Use Javascript for this client side scripting. Display appropriate error texts.
5. Write a python program to read in a list of numbers. Use one-line comprehensions of create a new list of even numbers. Create another list reversing the elements.
6. Create a HTML form that lists two items in a bakery along with its price. Ensure that one of the items is displayed using its image. Ask the user the quantity of the item he/she wants to buy. Display the amount the user has to pay. Ensure that the value entered is a number which is not negative, fraction or null. Use radio-buttons to ensure that only one item can be chosen at a time from the list. Use Javascript for this client side scripting. Display appropriate error texts.
7. Write a python program to define a student class that includes name, usn and marks of 3 subjects. Write functions calculate() - to calculate the sum of the marks print() to print the student details.
8. Write a python program that uses a recursive function to find the maximum of 'n' numbers.
9. Create a HTML form that contains the word "Pizza". On mouse-over an image of a Pizza must be shown to the user. The form must contain the text "Varieties of Pizza" initially with one variety of Pizza listed called "Mexican Veggie Pizza". A text box must be provided to enter any other pizza variety. This new pizza variety added will need to be added to the existing list and displayed either when the text-box entry is over, or on a button-click event. Use Javascript for this client side scripting. Display appropriate error texts.

PART B: JavaScript (JSON, Flask) and Python

1. Write a temperature converter python program, which is menu driven. Each such conversion logic should be defined in separate functions. The program should call the respective function based on the user's requirement. The program should run as long as the user wishes so. Provide an option to view the conversions stored as list of tuples with attributes - from unit value, to unit value sorted by the user's choice (from-value or to-value).

2. **Introduction to JavaScript (JS) -** Dynamically loading JSON data - Implement a simple HTML+JS application that has a JSON Array with details of different kinds of vehicles E.g., Model, Name, Price, Year. Display details of each vehicle dynamically by only showing details of the vehicle that the user has selected (via mouse-over). The page should consist of a table with 2 columns - 1 column for labels and 1 column for actual details. There must be a list of different vehicle names on the top. When the user hovers the mouse over any vehicle, the corresponding vehicle's details must be dynamically populated in the table.

3. Write a python program to read contents of a file (filename as argument) and store number of occurrences of each word in a dictionary. Display the top 10 words with most number of occurrences in descending order. Store the length of each of these words in a list and display the list. Write a one-line reduce function to get the average length and one-line list comprehension to display squares of all odd numbers and display both.

4. **Python and JavaScript - Form Validation:** Design a HTML form that allows users to enter their Name, USN, Date of Birth as well as marks of five subjects obtained in a semester along with the total grades for that subject. Validate the form using JavaScript on the client side. Ensure that all the fields are filled, and that the syntax is correct E.g. USN - 1MS02IS001 and DOB - dd/mm/yyyy. Ensure that the 'yyyy' value entered is between 1992 and 1998. The marks entered have to be between 0 to 100 only, while the credits value is between 1 to 4 only. On the server side, use Python to display the details entered by the user, along with grades obtained for each marks filled as well as the SGPA obtained. Use Python to ensure that valid dates are entered. E.g. 30/02/1999, 31/04/1998 are invalid. Use Display appropriate messages if error occurs, and redirect to the another HTML page if successful.

5. Write a python class to reverse a sentence (initialized via constructor) word by word. That is: "I am here" should be reversed as "here am I". Create instances of this class for each of the three strings input by the user and display the reversed string for each, in descending order of number of vowels in the string.

6. **Python and JavaScript - ATM Application:** Design a HTML form that displays user's current balance, an input field to enter amount and buttons to withdraw or deposit money. Validate the form such that

i) Negative amount cannot be entered

ii) Users cannot withdraw more than 5000 at one time

iii) Users cannot withdraw amount greater than their balance

iv) Users cannot deposit more than 10000 at one time

v) Users can perform at most 5 transactions

Update the balance accordingly and ensure relevant data is not lost on closing the browser.

7. Load the Titanic Dataset into one of the data structures (NumPy or Pandas). Do the following for this data set:
   - **a)** Display header rows and description of the loaded dataset.
   - **b)** Remove unnecessary features (E.g. drop unwanted columns) from the dataset.
   - **c)** Manipulate data by replacing empty column values with a default value.
   - **d)** How many entries does this dataset have?
   - **e)** How many attributes does this data set have?
   - **f)** List the attributes
   - **g)** What are the data types of the attributes?
   - **h)** What is the minimum and maximum age of the passengers in the data set?
   - **i)** What is the mean value of the "Age" attribute?
   - **j)** Plot a histogram depicting the number of people of a particular age
   - **k)** Label the x and y axis of this plot
   - **l)** What is the default graph plotted by a dataframe?

8. **Python and JavaScript - Shopping Cart Application:** Design a simple Shopping Cart application which allows users to add items to their cart from a list of products. Allow users to view their cart (items and quantities of each). Ensure that items in the cart persist even after closing the application. On selecting buy, print out a bill of items in the cart. Perform any necessary validation. Demonstrate data persistence even after the browser is closed.

9. Do the following to the Weather Dataset that you downloaded:
   - **a)** Change the Column Attributes in Dataframe to read as:

Old Attribute	New Attribute	Old Attribute	New Attribute
EDT	date	MeanDew PointF	mean_dew
Max TemperatureF	max_temp	Min DewpointF ---	min_dew
Mean TemperatureF	mean_temp	Max Humidity ----	max_humidity
Min TemperatureF	min_temp	Mean Humidity ----	mean_humidity
Max Dew PointF	max_dew	Min Humidity ---	min_humidity

Max Sea Level PressureIn	max_pressure	Min Sea Level PressureIn	min_pressure
Mean Sea Level PressureIn	mean_pressure	Max VisibilityMiles	max_visibilty
Mean VisibilityMiles	mean_visibility	Mean Wind SpeedMPH	mean_wind
Min VisibilityMiles	min_visibility	Max Gush SpeedMPH	min_wind
Max Wind SpeedMPH	max_wind	PrecipitationIn	precipitation
CloudCover	cloud_cover	Events	events
WindDirDegrees	wind_dir		

b) Draw the histogram depicting mean temperature
c) Draw line graph with different colours depicting minimum & maximum temperatures
d) Make sure there are appropriate labels for it
e) Draw a line graph showing the maximum temperature of last 8 days
f) How many days did it rain?
g) What is the maximum temperature in New York?
h) What was the average speed of the wind during the month?

NOTE: Program #4, #6 and #8 have to be done using the MVC Flask Python Framework. Wherever images are required, if the same is not provided, use computer screenshots.

POSSIBLE VIVA QUESTIONS (Could be asked from outside this set too)

1. Explain the difference between Client-side and Server-side scripting. When do we use which type of scripting?

2. What do you understand by MVC Framework? Which portions of MVC have you used in the programs in your syllabus?

3. What do you feel is the difference between a HTTP-GET and HTTP-POST?

4. What do you understand by a Web-server? Which programs in your syllabus require the use of a web-server and why?

5. What do you understand by the word “port number” which is displayed in a URL?

6. What do you understand by the word “query-string” which is displayed in a URL?

7. What is the difference between a “Button” and a “Submit” button in an HTML form?

8. What do you understand by JSON object? Why do we need it?

9. What is the advantage of using JSON over XML?

10. What is Flask? Why do you need it? What are the alternate tools existing?

11. You have learnt two Scripting Languages – Python & Javascript. Give one scenario where Python can be used and not JavaScript and vice-versa.

12. What is the difference between Static and Dynamic Web Pages? Which category does HTML belong to?

13. What is the significance of ‘FORM ACTION’ tag in HTML?

14. What is the difference between List, Tuple and Dictionary? Give one example scenario where each of these data structures are used.

15. Is Object oriented programming concepts of ‘Class’, ‘Objects’ possible in Python? Why do we need this?

16. What is the purpose of the ‘Lambda’ function in Python? What is the use of such category of functions – ‘map’, ‘reduce’ etc?

17. What is ‘List Comprehension’? Why do we need this feature in Python?

18. Explain the ‘split’ function in Python.

19. Explain the ‘for-each’ loop in Python

20. How do we define a constructor in Python?

21. How do you define and run functions in Python?

22. What is the significance of ‘__’ tag? E.g (__main__)

23. Why is indentation of code important in Python?

24. Which are the domains Python can be used? Which questions in your syllabus cater to these domains?

25. What is the difference between ‘numpy’ and ‘pandas’?

26. What are the various ways to import modules in Python? Give examples.