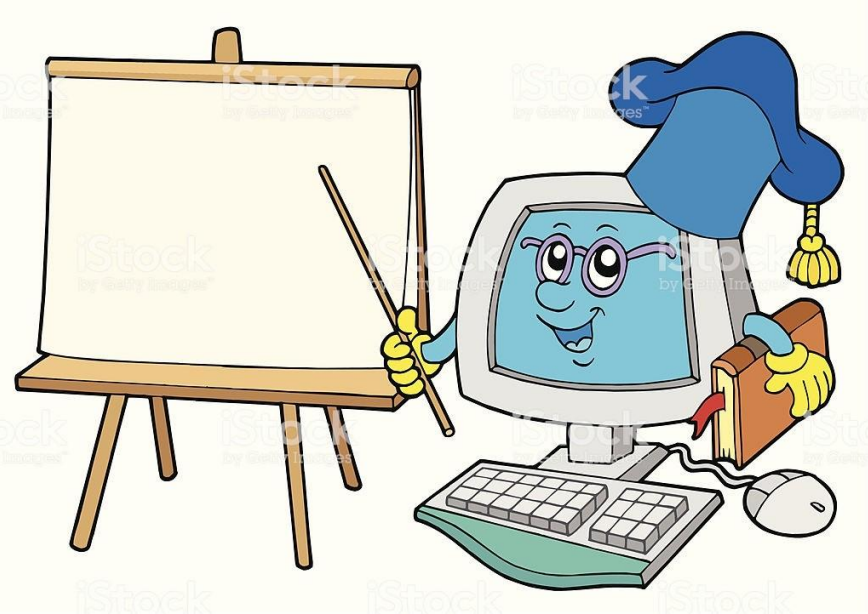
HIGHER SECONDARY SECOND YEAR

COMPUTER SCIENCE

UNIT V - Integrating Python with MySql and C++

BOOK BACK QUESTION & ANSWERS

2024 - 25



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CHAPTER 14: Importing C++ programs in Python

Choose the best answer: (1 Mark)

1. Which of the following is not a scripting language?
   (A) JavaScript (B) PHP (C) Perl **(D) HTML**
2. Importing C++ program in a Python program is called
   (A) wrapping (B) Downloading (C) Interconnecting (D) Parsing
3. The expansion of API is
   (A) Application Programming Interpreter
   (B) Application Programming Interface
   (C) Application Performing Interface
   (D) Application Programming Interlink
4. A framework for interfacing Python and C++ is
   (A) Ctypes (B) SWIG (C) Cython **(D) Boost**
5. Which of the following is a software design technique to split your code into separate parts?
   (A) Object oriented Programming **(B) Modular programming**
   (C) Low Level Programming (D) Procedure oriented Programming
6. The module which allows you to interface with the Windows operating system is
   (A) OS module (B) sys module (C) csv module (D) getopt module
7. getopt() will return an empty array if there is no error in splitting strings to
   (A) argv variable (B) opt variable **(C) args variable** (D) ifile variable
8. Identify the function call statement in the following snippet.

```
if __name__ =='__main__':
main(sys.argv[1:])
```

   (A) main(sys.argv[1:]) **(B) __name__** (C) __main__ (D) argv
9. Which of the following can be used for processing text, numbers, images, and scientific data?
   (A) HTML (B) C (C) C++ **(D) PYTHON**
10. What does __name__ contains ?
   (A) c++ filename (B) main() name
   (C) python filename (D) os module name

Answer the following questions: (2 Marks)

1. **What is the theoretical difference between Scripting language and other programming language?**

Scripting language	Programming language
Scripting languages do not require the compilation step and are rather interpreted.	Programming language needs to be compiled before running.
A scripting language requires an interpreter. Ex: pyhon	A Programming language requires a compiler. Ex: C++

2. **Differentiate compiler and interpreter.**

Compiler	Interpreter
Compiler reads entire program for compilation.	Interpreter reads single statement at a time for interpretation.
Error deduction is difficult.	Error deduction is easy.
Example: c++	**Example:** Python

3. **Write the expansion of (i) SWIG (ii) MinGW**
   - **SWIG** - Simplified Wrapper interface Generator
   - **MinGW** - Minimalist GNU for Windows.
4. **What is the use of modules?**
   - Modules are used to break down large programs into small manageable and organized files.
   - Modules provide reusability of code.
   - We can define our most used functions in a module and import it, instead of copying their definitions into different programs.
5. **What is the use of cd command. Give an example.**
   - **'cd'** command used to change directory and absolute path refers to the complete path where Python is installed.

   Syntax: cd <absolute path>

   Example: c:\>cd c:\ program files \ openoffice 4 \ program

Answer the following questions: (3 Marks)

1. **Differentiate PYTHON and C++**

PYTHON	C++
Python is an interpreter based language.	C++ is a compiler based language.
Python is interpreted dynamically	C++ is compiled statically
Data type is not required while declaring variable	Data type is required while declaring variable
It can act both as scripting and general purpose language	It is a general purpose language

2. **What are the applications of scripting language?**
   - To automate certain tasks in a program.
   - Extracting information from a data set.
   - Less code intensive as compared to traditional programming language.
   - Can bring new functions to applications and glue complex systems together.
3. **What is MinGW? What is its use?**
   - MinGw-W64 (version of MinGW) is the best compiler for C++ on Windows.
   - MinGW allows to compile and execute C++ program dynamically through Python program using g++.
   - Python program that contains the C++ coding can be executed through either by using command prompt or by using run terminal.
4. **Identify the module ,operator, definition name for the following.**

   welcome.display()

   Welcome - Module name
   . - Dot operator
   display() - Function call
5. **What is sys.argv? What does it contain?**
   - sys.argv is the list of command-line arguments passed to the Python program.
   - It's basically a list holding the command-line arguments of the program.
   - To use **sys.argv**, **import sys** should be used.
   - The first argument, sys.argv[0] contains the name of the python program (example pali.py)
   - sys.argv [1]is the next argument passed to the program (here it is the C++ file), which will be the argument passed through main ().

Answer the following questions: (5 Marks)

1. **Write any 5 features of Python.**
   - Python uses Automatic Garbage Collection whereas C++ does not.
   - C++ is a statically typed language, while Python is a dynamically typed language.
   - Python runs through an interpreter, while C++ is pre-compiled.
   - Python code tends to be 5 to 10 times shorter than that written in C++.
   - In Python, there is no need to declare types explicitly where as it should be done in C++
   - In Python, a function may accept an argument of any type, and return multiple values without any kind of declaration beforehand. Whereas in C++ return statement can return only one value.

2. **Explain each word of the following command.**

Python <filename.py> -<i> <C++ filename without cpp extension>

Python	keyword to execute the Python program from command-line
filename.py	Name of the Python program to executed
- i	input mode
C++ filename without cpp extension	name of C++ file to be compiled and executed

3. **What is the purpose of sys,os,getopt module in Python.Explain**

Python's sys module:

- sys module provides access to some variables used by the interpreter and to functions that interact with the interpreter.

Python's OS Module:

- The ***OS*** module in Python provides a way of using operating system dependent functionality.
- The functions that the ***OS*** module allows you to interface with the Windows operating system where Python is running on.

Python getopt module:

- The getopt module of Python helps you to parse (split) command-line options and arguments.
- This module provides getopt() method to enable command-line argument parsing.

4. **Write the syntax for getopt() and explain its arguments and return values**

Syntax: **<opts>,<args>=getopt.getopt(argv, options, [long_options])**

The detail of the parameters:

- **argv** − This is the argument list of values to be splited. In our program the complete command will be passed as a list.
- **options** − This is string of option letters that the Python program recognize as, for input or for output.
- **long_options** −This contains a list of strings.

returns value:

- getopt() method returns value consisting of two elements.
- Each of these values are stored separately in two different list (arrays) **opts** and **args** .
- Opts contains list of splitted strings like mode and path.
- **args** contains error string, if at all the comment is given with wrong path or mode.

5. **Write a Python program to execute the following c++ coding**

#include <iostream>
using namespace std;
int main()
{ cout<<“WELCOME”;
return(0);
}

The above C++ program is saved in a file welcome.cpp

c++ coding:

```
import sys, os, getopt
def main(argv):
        opts, args = getopt.getopt(argv, "i:")
        for o, a in opts:
                if o in "-i":
                        run(a)
def run(a):
        inp_file=a+'.cpp'
        exe_file=a+'.exe'
        os.system('g++ ' + inp_file + ' -o ' + exe_file)
        os.system(exe_file)
if __name__=='__main__':
        main(sys.argv[1:])
```

CHAPTER 15: Data manipulation through SQL

Choose the best answer: (1 Mark)

1. Which of the following is an organized collection of data?
   (A) Database (B) DBMS (C) Information (D) Records
2. SQLite falls under which database system?
   (A) Flat file database system **(B) Relational Database system**
   (C) Hierarchical database system (D) Object oriented Database system
3. Which of the following is a control structure used to traverse and fetch the records of the database?
   (A) Pointer (B) Key **(C) Cursor** (D) Insertion point
4. Any changes made in the values of the record should be saved by the command
   (A) Save (B) Save As **(C) Commit** (D) Oblige
5. Which of the following executes the SQL command to perform some action?
   (A) execute() (B) key() (C) cursor() (D) run()
6. Which of the following function retrieves the average of a selected column of rows in a table?
   (A) Add() (B) SUM() **(C) AVG()** (D) AVERAGE()
7. The function that returns the largest value of the selected column is
   (A) MAX() (B) LARGE() (C) HIGH() (D) MAXIMUM()
8. Which of the following is called the master table?
   (A) sqlite_master (B) sql_master (C) main_master (D) master_main
9. The most commonly used statement in SQL is
   (A) cursor **(B) select** (C) execute (D) commit
10. Which of the following clause avoid the duplicate?
    (A) Distinct (B) Remove (C) Where (D) GroupBy

Answer the following questions: (2 Marks)

1. **Mention the users who uses the Database.**
   - Users of database can be human users, other programs or applications
2. **Which method is used to connect a database? Give an example.**
   - Create a connection using **connect () method** and pass the name of the database File.

   Example: connection = sqlite3.connect ("Academy.db")
3. **What is the advantage of declaring a column as "INTEGER PRIMARY KEY"**
   - If a column of a table is declared to be an **INTEGER PRIMARY KEY**, then whenever a NULL will be used as an input for this column, the **NULL will be automatically converted into an integer** which will one larger than the highest value so far used in that column.
4. **Write the command to populate record in a table. Give an example.**
   - To populate (add record) the table "INSERT" command is passed to SQLite.

     Example: INSERT INTO Student (Rollno, Name)
     VALUES (101, "Akshay");
5. **Which method is used to fetch all rows from the database table?**
   - The **fetchall()** method is used to fetch all rows from the database table.

   Example: result = cursor.fetchall()

Answer the following questions: (3 Marks)

1. **What is SQLite?What is it advantage?**
   - SQLite is a simple relational database system.

   Advantage:
   - SQLite is fast, rigorously tested, and flexible, making it easier to work.
   - Python has a native library for SQLite.
2. **Mention the difference between fetchone() and fetchmany()**

fetchone()	fetchmany()
The **fetchone()** method returns the next row of a query result set or None in case there is no row left.	This method returns the number of rows of the result set.
Using while loop and fetchone() method we can display all the records from a table.	Displaying specified number of records is done by using fetchmany(n).

3. **What is the use of Where Clause.Give a python statement Using the where clause.**
   - The WHERE clause is used to extract only those records that fulfill a specified condition.

   EXAMPLE: To display the different grades scored by male students from "student table"

   cursor.execute("SELECT DISTINCT (Grade) FROM student where gender='M'")

4. **Read the following details.Based on that write a python script to display department wise records**

database name :- organization.db

Table name :- Employee

Columns in the table :- Eno, EmpName, Esal, Dept

Coding:

```
import sqlite3
connection=sqlite3.connect("organization.db")
c = connection.execute("SELECT * FROM Employee GROUP BY  dept")
for row in c:
    print(row)
connection.close( )
```

5. **Read the following details.Based on that write a python script to display records in desending order of Eno**

database name :- organization.db

Table name :- Employee

Columns in the table :- Eno, EmpName, Esal, Dept

Coding:

```
import sqlite3
connection = sqlite3.connect("organization.db")
cursor=connection.cursor()
cursor.execute("SELECT * FROM Employee ORDER BY Eno DESC")
result=cursor.fetchall()
print(result)
```

Answer the following questions: (5 Marks)

1. **Write in brief about SQLite and the steps used to use it.**

- SQLite is a simple relational database system, which saves its data in regular data files within internal memory of the computer.
- It is designed to be embedded in applications, instead of using a separate database server program such as MySQL or Oracle.

Advantages:

- SQLite is fast, rigorously tested, and flexible, making it easier to work.
- Python has a native library for SQLite. To use SQLite,

To use SQLite,

Step1: import sqlite3

Step2: Create a connection using connect () method and pass the name of the database File

Step3: Set the cursor object cursor = connection. cursor ()

Example:

```
Import sqlite3
Connection = sqlite3.connect ("Academy.db")
Cursor = connection.cursor( )
```

2. Write the Python script to display all the records of the following table using fetchmany()

Icode	ItemName	Rate
1003	Scanner	10500
1004	Speaker	3000
1005	Printer	8000
1008	Monitor	15000
1010	Mouse	700

Coding:

```
import sqlite3
connection=sqlite3.connect("company.db")
cursor=connection.cursor( )
cursor.execute("""DROP TABLE Product;""")
sql_command="""CREATE TABLE Product(Icode INTEGER PRIMARY KEY, Item_Name VARCHAR(20), Rate INTEGER);"""
cursor.execute(sql_command)
sql_command="""INSERT INTO Product VALUES (1003,"Scanner",10500);"""
cursor.execute(sql_command)
sql_command="""INSERT INTO Product VALUES(1004,"Speaker",3000);"""
cursor.execute(sql_command)
sql_command="""INSERT INTO Product VALUES(1005,"Printer",8000);"""
cursor.execute(sql_command)
sql_command="""INSERT INTO Product VALUES(1008,"Moniter",15000);"""
cursor.execute(sql_command)
sql_command="""INSERT INTO Product VALUES(1010,"Mouse",700);"""
cursor.execute(sql_command)
connection.commit( )
cursor.execute("SELECT * FROM Product")
ans=cursor.fetchmany(5)
for i in ans:
    print(i)
connection.close( )
```

Output:

```
(1003, 'Scanner', 10500)
(1004, 'Speaker', 3000)
(1005, 'Printer', 8000)
(1008, 'Moniter', 15000)
(1010, 'Mouse', 700)
```

3. **What is the use of HAVING clause. Give an example python script**

- Having clause is used to filter data based on the group functions.
- This is similar to WHERE condition but can be used only with group functions.
- Group functions cannot be used in WHERE Clause but can be used in HAVING clause.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT GENDER,COUNT(GENDER) FROM
Student GROUP BY GENDER HAVING COUNT(GENDER)>3")
result = cursor.fetchall()
co = [i[0] for i in cursor.description]
print(co)
print(result)
```

Output: ['gender','COUNT(GENDER)']
[('M', 5)]

4. **Write a Python script to create a table called ITEM with following specification.**

Add one record to the table.
Name of the database :- ABC
Name of the table :- Item
Column name and specification :-

Icode	**:-**	**integer and act as primary key**
Item Name	**:-**	**Character with length 25**
Rate	**:-**	**Integer**
Record to be added	**:-**	**1008, Monitor,15000**

Coding:

```
import sqlite3
connection=sqlite3.connect ("organization.db")
cursor=connection.cursor( )
cursor.execute ("""DROP TABLE item;""")
sql_command="""CREATE TABLE item(Icode INTEGER PRIMARY KEY,
Item_Name
VARCHAR(25),Rate INTEGER);"""
cursor.execute (sql_command)
sql_command="""INSERT INTO item VALUES(1008,"Monitor",15000);"""
cursor.execute (sql_command)
connection.commit( )
cursor.execute ("SELECT * FROM item")
ans=cursor.fetchall ( )
for i in ans:
    print(i)
connection.close ( )
```

Output: **(1008, 'Monitor', 15000)**

5. Consider the following table Supplier and item .Write a python script for (i) to (ii)

SUPPLIER				
Suppno	**Name**	**City**	**Icode**	**SuppQty**
S001	**Prasad**	**Delhi**	**1008**	**100**
S002	**Anu**	**Bangalore**	**1010**	**200**
S003	**Shahid**	**Bangalore**	**1008**	**175**
S004	**Akila**	**Hydrabad**	**1005**	**195**
S005	**Girish**	**Hydrabad**	**1003**	**25**
S006	**Shylaja**	**Chennai**	**1008**	**180**
S007	**Lavanya**	**Mumbai**	**1005**	**325**

Coding:

```
import sqlite3
connection=sqlite3.connect("company.db")
cursor=connection.cursor( )
cursor.execute ("""DROP TABLE Supplier;""")
sql_command="""CREATE TABLE Supplier(Suppno INTEGER, Name VARCHAR(25),
City VARCHAR(20), Icode INTEGER, SuppQty INTEGER);"""
cursor.execute(sql_command)
Supplier_data =[("S001","Prasad","Delhi","1008","100"),
        ("S002","Anu","Bangalore","1010","200"),
        ("S003","Shahid","Bangalore","1008","175"),
        ("S004","Ahila","Hydrabad","1005","195"),
        ("S005","Girish","Hydrabad","1003","25"),
        ("S006","Shylaja","Chennai","1008","180")
("S007","Lavanya","Mumbai","1005","325")]
for p in Supplier_data:
   format_str = """INSERT INTO Supplier (Suppno, Name, City, Icode, SuppQty)
   VALUES ("{sno}","{name}", "{city}", "{code}", "{qty}");"""
   sql_command=(format_str.format(sno=p[0],name=p[1],city=p[2],code=p[3],qty=p[4]))
   cursor.execute(sql_command)
connection.commit( )
cursor.execute("SELECT * FROM Supplier WHERE NOT City ='Delhi'")
print("Display All Suppliers not in Delhi")
ans=cursor.fetchall( )
for i in ans:
   print(i)
cursor.execute("UPDATE Supplier SET SuppQty = SuppQty + 40 WHERE Name
='Ahila'")
print("Update Ahila SuppQty")
cursor.execute("SELECT * FROM Supplier")
ans=cursor.fetchall( )
for i in ans:
   print(i)
connection.close ( )
```

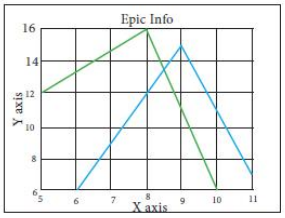
Output:

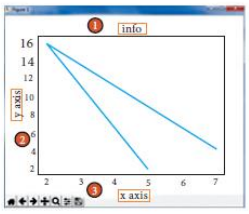
```
Display All Suppliers not in Delhi
('S002', 'Anu', 'Bangalore', 1010, 200)
('S003', 'Shahid', 'Bangalore', 1008, 175)
('S004', 'Ahila', 'Hydrabad', 1005, 195)
('S005', 'Girish', 'Hydrabad', 1003, 25)
('S006', 'Shylaja', 'Chennai', 1008, 180)
('S007', 'Lavanya', 'Mumbai', 1005, 325)
Update Ahila SuppQty
('S001', 'Prasad', 'Delhi', 1008, 100)
('S002', 'Anu', 'Bangalore', 1010, 200)
('S003', 'Shahid', 'Bangalore', 1008, 175)
('S004', 'Ahila', 'Hydrabad', 1005, 235)
('S005', 'Girish', 'Hydrabad', 1003, 25)
('S006', 'Shylaja', 'Chennai', 1008, 180)
('S007', 'Lavanya', 'Mumbai', 1005, 325)
```

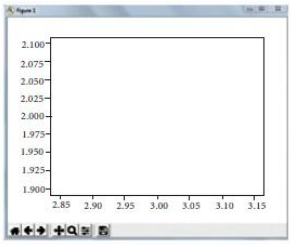
CHAPTER 16: Data visualization using pyplot: line chart, pie chart and bar chart

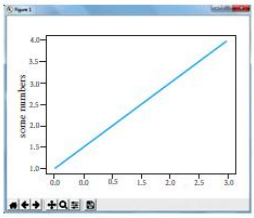
Choose the best answer: (1 Mark)

1. Which is a python package used for 2D charts?
   a) matplotlib.pyplot b) matplotlib.pip
   c) matplotlib.numpy d) matplotlib.plt
2. Identify the package manager for installing Python packages, or modules.
   a) Matplotlib **b) PIP** c) plt.show() d) python package
3. Which of the following feature is used to represent data and information graphically?
   a) Data List b) Data Tuple c) Classes and Objects **d) Data Visualization**
4. ..... is a collection of resources assembled to create a single unified visual display.
   a) Interface **b) Dashboard** c) Objects d) Graphics
5. Which of the following module should be imported to visualize data and information in Python?
   a) csv b) getopt c) mysql **d) matplotlib**
6. ..... is a type of chart which displays information as a series of data points connected by straight line segments.
   a) Line chart b) Pie chart c) Bar chart d) All the above
7. Read the code: import matplotlib.pyplot as plt
   plt.plot(3,2)
   plt.show()
   Identify the output for the above coding.

a. 

b. 

c. 

d. 

Ans: c

8. Identify the right type of chart using the following hints.
   Hint 1: This chart is often used to visualize a trend in data over intervals of time.
   Hint 2: The line in this type of chart is often drawn chronologically.
   a) Line chart b) Bar chart c) Pie chart d) Scatter plot
9. Read the statements given below. Identify the right option from the following for pie chart.
   Statement A: To make a pie chart with Matplotlib, we can use the plt.pie() function.
   Statement B: The autopct parameter allows us to display the percentage value using the Python string formatting.
   a) Statement A is correct b) Statement B is correct
   c) Both the statements are correct d) Both the statements are wrong

Answer the following questions: (2 Marks)

1. **What is Data Visualization?**
   - Data Visualization is the graphical representation of information and data.
2. **List the general types of data visualization.**
   - Charts * Tables * Graphs
   - Maps * Infographics * Dashboards
3. **List the types of Visualizations in Matplotlib.**
   - Line plot * Scatter plot * Histogram
   - Box plot * Bar chart and * Pie chart
4. **How will you install Matplotlib?**
   - **Matplotlib** can be installed using pip software.
   - Pip is a Package manager software for installing python packages.
5. **Write the difference between the following functions: plt.plot([1,2,3,4]), plt. plot([1,2,3,4], [1,4,9,16]).**

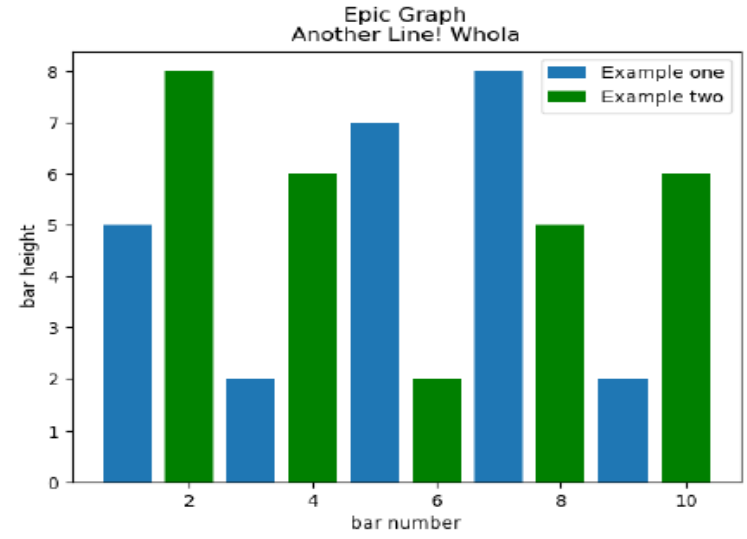
plt.plot([1,2,3,4])	**plt.plot([1,2,3,4], [1,4,9,16])**
It refers y value as [1,2,3,4]	It refers x and y values as ([1,2,3,4], [1,4,9,16])
Indirectly it refers x values as [0,1,2,3] (0,1) (1,1) (2,3) (3,4)	Directly x and y values are given as (1,1) (2,4) (3,9) (4,16)

Answer the following questions: (3 Marks)

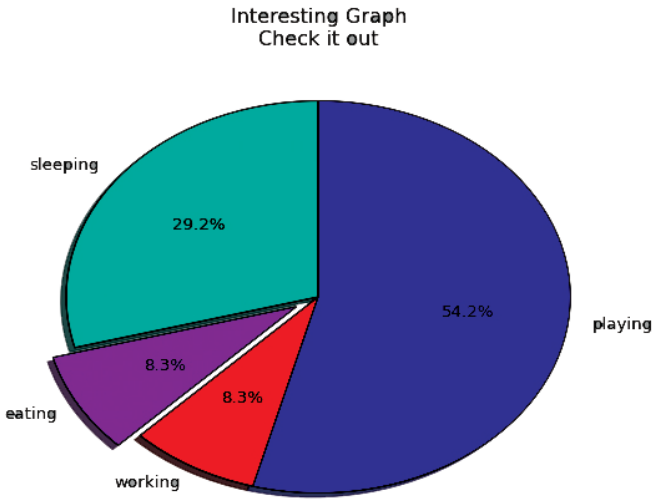
1. **Draw the output for the following data visualization plot.**

```
import matplotlib.pyplot as plt
plt.bar([1,3,5,7,9],[5,2,7,8,2], label="Example one")
plt.bar([2,4,6,8,10],[8,6,2,5,6], label="Example two", color='g')
plt.legend()
plt.xlabel('bar number')
plt.ylabel('bar height')
plt.title('Epic Graph\nAnother Line! Whoa')
plt.show()
```

Output:



2. **Write any three uses of data visualization.**
   - Data Visualization help users to analyze and interpret the data easily.
   - It makes complex data understandable and usable.
   - Various Charts in Data Visualization helps to show relationship in the data for one or more variables.
3. **Write the plot for the following pie chart output.**



Coding:

```
import matplotlib.pyplot as plt
sizes=[29.2,8.3,8.3,54.2]
labels=["Sleeping","Eating","Working","Playing"]
cols=['c','m','r','b']
plt.pie(sizes,
labels=labels,
colors=cols,
startangle=90,
shadow=True,
explode=(0,0.1,0,0),
autopct='%1.1f%%')
plt.title('Intresting Graph\nCheck it out')
plt.show( )
```

Answer the following questions: (5 Marks)

1. **Explain in detail the types of pyplots using Matplotlib.**
   - **Line Chart:** A Line Chart is a type of chart which displays information as a series of data points called 'markers' connected by straight line segments.
   - **Scatter plot:** A scatter plot is a type of plot that shows the data as a collection of points.
   - **Histogram:** Histogram refers to a graphical representation; that displays data by way of bars to show the frequency of numerical data.
   - **Box plot:** The box plot is a standardized way of displaying the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum.
   - **Bar Chart:** Bar Chart shows the relationship between a numerical data and a categorical values.
   - **Pie Chart:** It is a circular graphic which is divided into slices to illustrate numerical proportion. The point of a pie chart is to show the relationship of parts out of a whole.
2. **Explain the various buttons in a matplotlib window.**
   - **Home Button** → If you ever want to return back to the original view, you can click on this.
   - **Forward/Back buttons** → These buttons can be used like the Forward and Back buttons in your browser.
   - **Pan Axis** → To click it, and then click and drag your graph around.
   - **Zoom** → The Zoom button lets you click on it, then click and drag a square that you would like to zoom into specifically. Zooming in will require a left click and drag. You can alternatively zoom out with a right click and drag.
   - **Configure Subplots** → This button allows you to configure various spacing options with your figure and plot.
   - **Save Figure** → This button will allow you to save your figure in various forms.
3. **Explain the purpose of the following functions:**

   a. plt.xlabel - specifies label for X-axis
   b. plt.ylabel - specifies label for Y-axis
   c. plt.title - specifies title to the graph
   d. plt.legend() - Calling legend() with no arguments automatically fetches the legend handles and their associated labels.
   e. plt.show() - Display a figure. When running in Python with its Pylab mode, display all figures and return to the Python prompt.

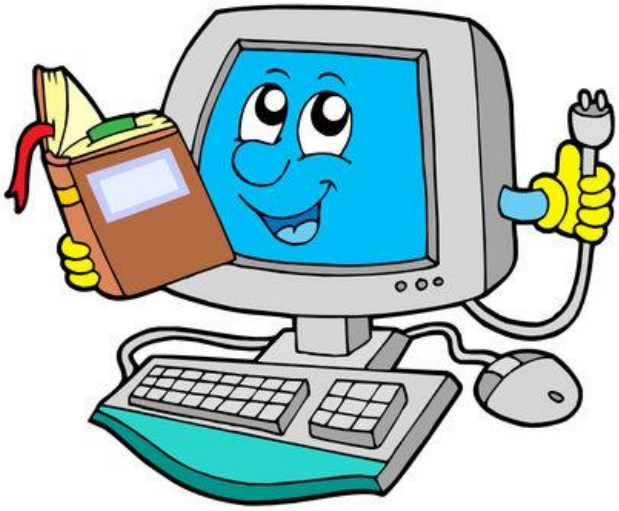
Education Is The

Most Powerful Weapon

Which You Can Use

To Change The World.

ALL THE BEST!



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