SAVITIBAI PHULE UNIVERSITY OF PUNE
M.Sc. (Computer Science) Part I Semester I
Practical Examination 2019-2020
SUBJECT: PPL AND Database Technologies Practical (CSUP115)

Time: 3 hours Max. Marks: 70

Write a program to create a MAP with empname and deptname. Print details of all employees working in the same department, as "Mr. Joshi". (create MAP : 10M logic: 10M print :5M)	**30**
1. Model the following Department system as a document database. Consider a set of students, course and marks. A student can register for more than one course. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries a. Count the number of students having more than 80 percentage [$2^{1/2}$] b. List the name and age of the oldest 5 students with marks less than 40 [$2^{1/2}$] c. Use a cursor to display names of students whose percentage is greater than 70. [5] d. Find all female students which either live in Pune and Mumbai or got percentage less than 50 [5]	**30**
Viva	**10**

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A. Write a program to read five random numbers and convert it to binary and octal using user defined functions. (random number : 5M binary : 5M Octal : 5M) B. Write a program to calculate average of all prime numbers between n1 and n2 (take n1 and n2 from user). (accept n1, n2 : 5M prime numbers : 5M average :5M)	**30**
1. Model the following sales system as a document database. Consider a set of products, customers, orders and invoices. An invoice is generated when an order is processed. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List all products in the inventory. [$2^{1/2}$] b. List the details of orders with a value >10000. [$2^{1/2}$] c. List all the orders which has not been processed (invoice not generated). [5] d. List all the orders along with their invoice for "Mr. Arun Kumar". [5]	**30**
Viva	**10**

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Create an abstract class Order (id, description). Derive two classes PurchaseOrder and SalesOrder with details of Supplier and Customer respectively. Create object of each PurchaseOrder And SalesOrder. Display the details of the supplier and customer. (abstract class : 5M derivation : 20 M display : 10M)	30
1. Model the following books system as a document database. Consider a set of books and publishers A publisher can publish more than one book. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List all Publishers which are located in Mumbai [$2^{1/2}$] b. List the details of books with a cost >1000. [$2^{1/2}$] c. List all the book which are written by "RaghuRamkrishnan" and published in 2017 [5] List all the books published by "O Reilly" and are written either in English or Marathi [5]	30
Viva	10

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Write a program to calculate transpose of a matrix and check if the resultant matrix is lower triangular or not. (accept : 5 M transpose : 10M check lower triangular:10M display:5M)	**30**
1. Model the following Hospital information system as a document database. Consider hospitals in and around Pune. Each hospital may have one or more specializations like Pediatric, Gynaec, Orthopaedic, etc. A person can recommend/provide review for a hospital. A doctor can be associated with one or more hospitals. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries a. List the names of hospitals with pediatric specialization. [$2^{1/2}$] b. List the Names of doctors who are visiting "Jehangir Hospital " on Mondays. [$2^{1/2}$] c. List the names of hospitals which are multispecialty hospitals where Dr. Kale visits. [5] d. List the names of people who have given a rating of (>=3) for "Jehangir Hospital" [5]	**30**
Viva	**10**

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Write a program to create two sets of strings and find common strings between them. Merge sets after removing common strings. Display resultant set. (create sets:10M find common elements:5M merge removing common :10M display:5M)	**30**
1. Model the following blog database with the following requirements: Every post has the unique title, description and url, Every post can have one or more tags, Every post has the name of its publisher and total number of likes, Every post has comments given by users along with their name, message, data-time and likes. On each post, there can be zero or more comments. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries a. List all the blogs which are tagged as food blogs [$2^{1/2}$] b. List all the blogs that are posted by "Amit" [$2^{1/2}$] c. List all the blogs that are tagged a "travel blogs" and were created before 2018 and are have comments written by "Sagar" and commented as "like" [5] d. List all the blogs that have comments which are posted before August 2019 or are not liked by the user posting the comment [5]	**30**
Viva	**10**

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Write a program to read a character and a string from user and remove first and last occurrence of the character from the string. Display resultant string after reversing its case. (read : 10 M remove occurance:10M reverse : 5M display :5M)	**30**
1. Model the following Tours information as a document database. A tour will consider the source and destination. Destination may be all around the world. The tours are planned using different tourism industries. The industries provide the complete information before selecting a particular package. Customers select different packages according to their requirements and can rate/review the tourism industry. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List the details of packages provided by "Veena World" [$2^{1/2}$] b. List the highest rated tourism industry. [$2^{1/2}$] c. List all the details of expenses made by John on his first 3 trips. Also display the total expenses. [5] d. List the names of the customers who went on a tour to Shillong. [5]	**30**
Viva	**10**

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Write a program for multiplication of two matrices. Also check if the resultant matrix is upper triangular or not. (Validate number of rows and columns before multiplication and give appropriate message).	**30**
1. Model the following scientist information as a document database. The document keeps information about the scientist who has contributed in various fields like Artificial intelligence, Fortran etc. The scientist may have contributed in more than one filed. The scientist may have received more than one awards for his contribution in various fields. 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List names of all scientists whose last name starts with a N [$2^{1/2}$] b. List all scientist who were born after 1/1/1950 and are still alive [$2^{1/2}$] c. For each year list the identifiers of scientists that received an award in that year [5] d. List all scientists who have received "Turing Machine Award" before 1980 and has made contributed in 4 fields [5]	**30**
Viva	**10**

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Create array of strings and read a new string from user. Display all the strings from the array that contain the new string. (accept array and string: 10M check string logic : 10M display 10M)	**30**
1. Model the following inventory information as a document database. The inventory keeps track of various items. The items are tagged in various categories. Items may be kept in various warehouses and each warehouse keeps track of the quantity of the item. 2. Assume appropriate attributes and collections as per the query requirements [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List all items from the inventory where the status equals "D" and qty is greater than 30 [$2^{1/2}$] b. List all items which have 3 tags [$2^{1/2}$] c. List all items having status equal to "A" or having quantity less than 30 and height of the product should be greater than 10 [5] d. Find all warehouse that keeps item "Planner" and having instock quantity less than 20 [5]	**30**
Viva	**10**

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Create a MAP for storing the following information about 5 students, where each Student is described with Name and percentage. Display Student information with highest percentage. (create MAP : 10M select with highest logic: 10M display : 10M)	**30**
1. Model the following transaction information as a document database. The transaction keep track of items purchased by a customer and the way in which the payment was done – Cash, Credit Card or Debit Card 2. Assume appropriate attributes and collections as per the query requirements. [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. Find all transactions which were made by the user "John" [$2^{1/2}$] b. Find all the transactions which were made using debit card [$2^{1/2}$] c. Find transaction id and total amount of purchase made using a credit card [5] d. Find the total payment for each payment type [5]	**30**
Viva	**10**

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Create abstract class Shape with abstract functions volume() and display(). Extend two classes Cube and Cylinder from it. Create object of Cube and Cylinder, Calculate volume of each and display it. (create abstract class :5M extend classes : 5M functions: 5M each display: 10M)	**30**
1. Model the following Online Mobile Shopping information as a document database. Consider online mobile shopping where the customer can get different models from different brands. Customers can rate the brands and the models individually. 2. Assume appropriate attributes and collections as per the query requirements [5] 3. Insert at least 10 documents in each collection. [10] 4. Answer the following Queries. a. List the mobiles having RAM and ROM as 3GB and 32GB. [$2^{1/2}$] b. List the customers who bought Samsung J6. [$2^{1/2}$] c. List the names of the distinct brands available. Also display the name of the brand with highest rating. [5] d. List all the customers in ascending order who bought iPhone 7plus. [5]	**30**
Viva	**10**

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	Write a program to read two strings. Find the occurrence of second string in the first string. Reverse the case of each occurrence in the string and display resultant string. (read : 5M find occurance:10M reverse : 10M display: 5M)	**30**
	Model the following Society relations among people working in "HCL", as a graph model, and answer the queries using Cypher. A person can be a friend of another person. A person may have siblings (brothers / sisters), A person may be a parent(mother/father) of another person. A person stays either in Pune or Mumbai or Kolhapur. A person may be working on either 'Finance' or 'Inventory' or 'Sales' projects. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [10] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [5] 3. Answer the following Queries in Cypher: a. List the names of people who are parents. [$2^{1/2}$] b. List the names of people working on 'Finance 'project [$2^{1/2}$] c. List the names of people staying in 'Pune' and 'Mumbai'. [5] d. List the names of people who are mothers. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
	Viva	**10**

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Write a program for multiplication of two matrices. Find determinant of resultant matrix. (Accept matrix: 5M Multiplication : 10M Determinant : 10M Display:5M)	**30**
Model the following Dairy Brand information as a graph model, and answer the following queries using Cypher. There are various dairy brands like Amul, Go, Britannia, Gokul etc. Their popularity varies across different states in India. The popularity is measured as %, with a high popularity defined as >=90%, Medium Popularity between 50 to 90%, and Low popularity <50%. Each brand manufactures various types of Dairy products like milk, butter, cheese, curd etc. The milk product can be categorized into low fat/medium fat or high fat content type. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the following queries using Cypher: a. List the names of different brands considered in your graph. [$2^{1/2}$] b. List the brands that are highly popular in Maharashtra. [$2^{1/2}$] c. List the popular cheese brands in Gujarat. [5] d. List the brands manufacturing "low" fat content milk. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

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Write a program to merge two sets of integers and calculate sum of all integers in the merged set. Also display largest and smallest element from merged set. (Merge : 10M sum :5M largest :5M smallest :5 M display : 5M)	**30**
Model the following Import Export information as a graph model, and answer the following queries using Cypher. There are countries which import and export products to each other. Products are produced across different states in a country. Production of the products is measured in %. A product can be exported if its production exceeds 60%. A product needs to be imported if its consumption percentage is more than its production percentage in a country. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the following Queries a. List the countries that export oil. [$2^{1/2}$] b. List the products produced in "Maharashtra". [$2^{1/2}$] c. List the countries that produce more than 70% sugarcane. [5] d. List the countries that do not import any product. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

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Design an abstract class Employee with computeSal() as an abstract function. Create two subclasses Worker and Manager. Salary of worker should be calculated on hourly basis of work and Salary of Manager should be calculated on monthly basis with additional incentives. Create five objects each of Worker and Manager class, and display their details. (abstract class and function :10M subclasses:5M salary calculation: 5 M each display:5M)	**30**
Model the following Furniture Showroom information as a graph model, and answer the queries using Cypher. Consider a furniture showroom with different types of furniture like sofas sets, tea tables, cupboards, beds, dining tables, etc. Showroom is divided into different sections, one section for each furniture type, each section is handled by a sales staff. A sales staff can handle one or more sections. Customer may enquire about furniture. An enquiry may result in a purchase by the customer. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the queries. a. List the types of furnitures available in the showroom. [$2^{1/2}$] b. List the sections handled by Mr. Satish. [$2^{1/2}$] c. List the names of customers who have done only enquiry but not made any purchase. [5] d. List the fast-moving furniture types. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

Write a program to create a list of 1 to 100 numbers. Create second list from first list selecting numbers which are perfect square. Display it.	**30**

(create first list: 10M find perfect square : 10M create second list :5 M display : 5M)	
Model the following Clothing Brand information as a graph model, and answer the following queries using Cypher. Consider a Mall for clothing. This mall will include different sections for males, females and kids. Each section contains different types of apparels from different brands. There are many apparels with different designs, of each type. An apparel may be available in one or more standard sizes (S/M/L/XL/XXL). Sales staff is assigned for each section. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the queries a. List the different apparels type in female section. [$2^{1/2}$] b. List the names of sales staff in 'kids' section. [$2^{1/2}$] c. List the standard sizes available for shirts in male section. [5] d. List the brand having least number of apparels under it. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

Write user defined functions to reverse the case of a given string and call the function using MAP.	**30**

(user defined function :10 M reverse case logic : 10M call using MAP : 10M)	
Model the following Hotels information as a graph model, and answer the following queries using Cypher. Consider hotels in Pune. Some hotels provide lodging facility whereas some provide only restaurant facility and some provide both. A person can rate (1-5 stars) a hotel for its facility/facilities. A person can recommend a hotel to his/her friends. A person can provide a review for a hotel after his stay/visit. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the Queries. a. List the names of hotels in Camp area. [$2^{1/2}$] b. List the names of hotels having both lodging and restaurant facility. [$2^{1/2}$] c. List the names of hotels with high rating (>=4). [5] d. List the most recommended hotels in Koregaon Park area. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

Define a class SavingAccount (accNo, name, balance, minBalance). Define appropriate constructors and operations withdraw(), deposit(),	**30**

viewBalance(). Create an array of SavingAccount objects and perform operations and display them. (define class:5M constructors: 10M operations: 5 M each)	
Model the following Hospitals information as a graph model, and answer the following queries using Cypher. Consider hospitals in and around Pune. Each hospital may have one or more specializations like Pediatric, Gynaec, Orthopedic, etc. A person can recommend/provide review for a hospital. A doctor can be associated with one or more hospitals. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the Queries a. List the names of hospitals with pediatric specialization. [$2^{1/2}$] b. List the Names of doctors who are visiting "Jehangir Hospital" on Mondays. [$2^{1/2}$] c. List the most recommended Hospital for Gynaec specialization. [5] d. List the names of people who have given a rating of (>=3) for "Jehangir Hospital" [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

Write a program to calculate sum of all perfect numbers between 1 and 100. Display perfect numbers also.	**30**

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(find Perfect number : 10 M sum : 10M display numbers and sum: 10M)	
Model the following Doctor's information system as a graph model, and answer the following queries using Cypher. Consider the doctors in and around Pune. Each Doctor is specialized in some stream like Pediatric, Gynaec, Heart Specialist, Cancer Specialist, ENT, etc. A doctor may be a visiting doctor across many hospitals or he may own a clinic. A person can provide a review/can recommend a doctor. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the Queries a. List the Pediatric doctors in Camp Area. [$2^{1/2}$] b. List the doctors who own a clinic. [$2^{1/2}$] c. List the most recommended Gynaec in Kothrud. [5] d. List all the reviews for "Dr. Kulkarni". [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

A. Create lists using five different methods and display each of them.(List style, java style, fill, range, tabulate methods) (each method : 2 M display : 1M each)	**30**

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B. Create a list of 50 members using function 2n+3. Create second list excluding all elements multiple of 5. (Create list with function: 5M Create second list : 5M display : 5M)	
Model the following Automobile information system as a graph model, and answer the following queries using Cypher. Consider an Automobile industry manufacturing different types of vehicles like Heavy Vehicles, Light Vehicles, etc. A customer can buy one or more types of vehicle. A person can recommend or rate a vehicle type. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the Queries a. List the characteristics of heavy vehicle types. [$2^{1/2}$] b. List the name of customers who bought a light vehicle. [$2^{1/2}$] c. List the customers who bought more than one type of vehicle. [5] d. List the most recommended vehicle type. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**

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Create a list of 10 random numbers. Create another list from members of first list using function $3n^2+4n+6$. Display second list in ascending order. (random numbers list: 10M create list with function: 10M display with ascending order : 10M)	**30**
Model the following University information system as a graph model, and answer the following queries using Cypher. University has various departments like Mathematics, Geology, Chemistry, etc. Each department conducts various courses and a course may be conducted by multiple departments. Every course may have recommendations provided by people. 1. Identify the labels and relationships, along with their properties, and draw a high-level Graph model. [5] 2. Create nodes and relationships, along with their properties, and visualize your actual Graph model. [10] 3. Answer the Queries a. List the names of the courses provided by Chemistry Department. [$2^{1/2}$] b. List the details of all the departments in the university. [$2^{1/2}$] c. List the names of common courses across chemistry and zoology department. [5] d. List the most recommended course in Computer Science Department. [5] [Note: You may Assume additional labels and properties depending on the query requirements]	**30**
Viva	**10**