02/12/2022 8/C 2:30pm

Deccan Education Society's

FERGUSSON COLLEGE (Autonomous) Pune-4

Affiliated to Savitribai Phule Pune University

F.Y. B. Sc.(Computer Science) (Semester : I)

Subject: Computer Science

Paper Title: Basic Programming using C

Paper Code: CSC1101

2019 Pattern (2 Credits)

[Time: 2 Hrs. 30 Min] **[Max. Marks : 50]**

Instructions to the candidates:

1. All questions are compulsory.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right side indicate full marks.

Q1) **Answer the following questions (Any Five). Two Marks Each** **10 M**

a) Define flowchart.
b) State any two limitations of an array.
c) State types of comments with its syntax.
d) The default case in 'switch' statement must be at the end. State T/F. Justify.
e) State the use of local variables.
f) Define unary operators.

Q2) **Answer the following questions (Any Four). Three Marks Each** **12 M**

a) Explain how function is declared and defined with suitable example.
b) Illustrate the different types of an array with suitable example.
c) Define identifier. Explain the rules of identifier.
d) Explain different format specifiers with suitable example.
e) Explain "goto" statement with syntax and suitable example.

Q3) **Answer the following questions (Any Three) Three Marks Each** **9 M**

a) Draw flowchart to find a number is even or odd.
b) Demonstrate the use of for loop with syntax and example.
c) Demonstrate the use of else-if ladder with suitable example.
d) Implement an algorithm to find first 'n' terms of Fibonacci series.

Q4) **Answer the following questions (Any Two). Three Marks Each** **6 M**

a) Differentiate between if-else and switch case.
b) Explain the use of do-while statement with suitable example.
c) Explain any three storage classes.

Q5) **Answer the following questions (Any Two) Four Marks Each** **8 M**

a) Find out the error (if any) in the following code. Write corrected code if any error is found. Otherwise predict and justify the output:

```
#include <stdio.h>
int main()
{
  int x;
  int y;
  x =65;
```

```
    y =97;
    printf("%c \n", x);
    printf("%c  \n", y);
    printf("%d  \n", x);
    return 0;
}
```

b) Find out the error (if any) in the following code. Write corrected code if any error is found. Otherwise predict and justify the output:

```
#include<stdio.h>
int fun();
int main()
{
 printf("%d ", fun());
 printf("%d ", fun());
 return 0;
}
int fun()
{
 static int count = 0;
 count++;
 return count;
}
```

c) Find out the error (if any) in the following code. Write corrected code if any error is found. Otherwise predict and justify the output:

```
#include<stdio.h>
int main()
{
    float a = 3.5;
    switch(a)
    {
      case 0.5 : printf("\n Good Morning");
                 break;
      case 1.5 : printf("\n Good Afetrnoon")
                 break;
      case 3.5 :  printf("\n Good Evening");
                 break;
       }
      return  0;
}
```

Q6) **Answer the following questions (Any One) Five Marks Each** **5 M**

a) Accept 'n' integer elements in an array and a number. Implement a function to count the occurrence of a number in the array.

b) Write a program using recursive function to find the factorial of a given number.

02/12/2022
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Deccan Education Society's

Fergusson College (Autonomous), Pune-4

T.Y.B.Sc. (Semester V)

Subject: Computer Science

(CSC3505)Computer Networks –II (2019 pattern)

Time: 2 Hrs30 Min. **Max. Marks: 50**

Instruction to candidates:

i) **All questions are compulsory**
ii) **Figures to the right indicate full marks**

Q.1 **Attempt any <u>five</u> questions:** **[2 x 5 =10]**

a) Define the following:
   1. Well-known ports
   2. Registered ports

b) State any two applications of UDP.

c) Define full-duplex communication.

d) State the difference between reliable and unreliable services.

e) Define virus.

f) Define Domain Name Space.

g) Define the following terms:
   1. Cipher text
   2. Steganography

Q.2 **Attempt any <u>five</u> questions:** **[3 x 5 =15]**

a) Write a short note on multiplexing and demultiplexing in transport layer.

b) Differentiate between TCP and UDP.

c) What is namespace? Write a short note on anyone way of organizing namespace

d) List the types of documents supported by www. Explain any one in brief.

e) What are the different types of attacks

f) Convert following plain text into cipher text using substitution technique.
Plain Text: "The most precious resource we all have is time"
Key = 4

g) Explain the Numbering system used in TCP.

Q.3 **Attempt any <u>five</u> questions:** **[5 x 5 =25]**

a) Explain the working of three-way handshaking protocol.

b) Write a short note on packet filter in firewalls.

c) Explain the WWW Architecture.

d) Explain DNS in the Internet with suitable diagram

e) Explain Caesar-Cipher technique of encryption with suitable example.

f) Explain freedom of speech in relation to security.

g) Write a short note on FTP communication over data connection.

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Deccan Education Society's

FERGUSSON COLLEGE (Autonomous) Pune-4

Affiliated to Savitribai Phule Pune University

F.Y.BSc(C.S) (Semester : I)

Subject: Mathematics

Paper Title: Algebra

Paper Code: MTC1102

2019 Pattern (2 Credits)

[Time: $2\frac{1}{2}$ Hours] **[Max. Marks : 50]**

Instructions to the candidates:

1) All questions are compulsory.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to the right side indicate full marks.

Q1) **Answer the following questions (Any Five). Two Marks Each** **10 M**

a) Define a Cyclic group.
b) Show that: On Z , $a * b = a + b - ab$ is binary operation .
c) State $\emptyset(850)$.
d) If a and b are odd integers then show that $a^2 + b^2$ is not divisible by 4.
e) Show that gcd (126, 65) = 1.
f) Define weight of a code word.

Q2) **Answer the following questions (Any Four). Three Marks Each** **12 M**

a) Show that: If a,b,c are integers and if a|b or a|c then a|bc.
b) Discuss: If m is an even integer then $m^2 \equiv 0(mod\ 4)$
c) Explain "In a group every element has unique inverse".
d) Discuss a parity check matrix and a generator matrix of a group code.
e) From the following composition table for A = {a,b,c} discuss the following:
i) Is '$*$' commutative ?
ii) Compute $a * (b * c)$, $(a * a) * c$?
iii) Is '$*$' associative ?

$*$	a	b	c
a	a	c	b
b	c	b	a
c	c	a	c

Q3) **Answer the following questions (Any Three) Three Marks Each** **9 M**

a) In Z_{11} , Calculate $(\overline{-2})^5$, $(\overline{18})^2$, $(\overline{15})^5$.
b) Apply Fermat's theorem for finding remainder of 2^{340} when divided by 31.
c) Solve: In Z , $a * b = a + b + 2$ is commutative and associative operation.
d) Calculate minimum distance for the following code:
C={0000 ,0111 ,1000 ,1111} in Z_2.

Q4) **Answer the following questions (Any Two). Three Marks Each** **6 M**

a) Explain "If $a \equiv b(\text{mod } n)$ then $a + x \equiv b + x(\text{mod } n) : x \in Z$ ".write the justification.

b) Explain the residue class modulo n , where $n \in N$. Find residue class of 3 modulo 7.

c) Compute all generators of a cyclic group of order 10.

Q5) **Answer the following questions (Any Two) Four Marks Each** **8 M**

a) Calculate $\alpha\beta, \alpha\beta^2, \beta\alpha^{-2}$ if $\alpha = (1\ 2\ 6\ 5\ 4\ 3), \beta = (1\ 3\ 5\ )(2\ 4\ \ 6)$.

b) Determine composition table for addition and multiplication of Z_8

c) Find gcd of (243,198) and determine values of m and n such that $d = 243m + 198n$.

Q6) **Answer the following questions (Any One) Five Marks Each** **5 M**

a) Let R be set of all real numbers.Define a binary operation '*' as $a * b = a + b + ab$, for $a , b \in$ R.Prove that (R,*) is a group.

b) Solve by using Chinese Remainder theorem:
$x \equiv 3(\text{mod } 5) , x \equiv 1(\text{mod}7), x \equiv 6(\text{mod } 8)$.

03/12/2022
2:30pm

Deccan Education Society's

Fergusson College (Autonomous), Pune-4

F.Y.B.Sc. (Semester I)

Subject: Computer Science

(CSC1102) Database Management System: SQL (2019 pattern)

[Time: 2 Hrs. 30 Min] **[Max. Marks: 50]**

Instructions to the candidates:

1) All questions are compulsory.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to the right side indicate full marks.

Q1) **Answer the following questions (Any Five). Two Marks Each** **10 M**

a) Define foreign key with an example.
b) Define 1 NF with an example.
c) State the purpose of intersect operation in relational algebra.
d) List the commands of DDL and TCL.
e) State the purpose of alter table command to drop column with example.
f) Define candidate key.

Q2) **Answer the following questions (Any Four). Three Marks Each** **12 M**

a) Discuss the following commands with an example –
   i) Select
   ii) Delete
b) Discuss derived attribute with example.
c) Explain responsibilities of DBA.
d) Discuss the following with suitable example –
   i) One to one relationship
   ii) Ternary relationship
e) Discuss DML commands in detail.

Q3) **Answer the following questions (Any Three) Three Marks Each** **9 M**

a) Consider the following relations –
   student(sno, sname, saddress)
   subject(subjcode, subjname, marks)
   student and exam are related to 1: M relationship. Create RDB for the above and solve the following queries in SQL.
   i) Change the subjname from 'DBMS' to 'RDBMS of subjcode=101.
   ii) Select the details of the student 'Mr. Anup'.
b) Compare the advantages and disadvantages of DBMS.
c) Explain alter table command to add column with primary key.
d) Give an example of outer Join in detail.

Q4) **Answer the following questions (Any Two). Three Marks Each** **6 M**

a) Consider the following relations –
Book(bookno, bkname, issuedate, returndate)
Student(rno, sname, class)
Book and student are related with M: M relationship. Create RDB for the above and construct the queries in relational algebra.
   i) Find the students issuing the 'PLSQL' book.
   ii) List the name of the book and issuedate whose returndate is '2004-02-12'

b) Identify network data model of DBMS.

c) Explain any 3 aggregate functions with example.

Q5) **Answer the following questions (Any Two) Four Marks Each** **8 M**

a) What are symbols used in ER diagram. Explain with example.

b) Compare selection and projection operation in relational algebra.

c) What is data abstraction? Explain in Details.

Q6) **Answer the following questions (Any One) Five Marks Each** **5 M**

a) Consider a trucking company which is responsible for picking up shipments for warehouses of a retail chain and deliver the shipments to the individual store location. A truk may carry several shipments in a single trip and deliver it to multiple stores. Prepare an Entity Relationship diagram for the above.

b) In course management system, university has various students and designs various courses. Courses run through batches and taught by teachers. The time-table is prepared by teachers and department conducts various courses batchwise. Prepare an Entity Relationship diagram for the given data.

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Deccan Education Society's
Fergusson College (Autonomous), Pune-4

T.Y.B.Sc. (Semester V)
Subject: Computer Science
(CSC 3506) Theoretical Computer Science (2019 pattern)

Time: 2 Hrs 30 mins **Max. Marks: 50**

Instruction to candidates:

i) All questions are compulsory
ii) Figures to the right indicate full marks

Q.1 **Attempt any five questions:** **[2 x 5 =10]**

a) Define power set. What is the power set of a set X= {q1, q2, q3}?

b) Construct a DFA to accept a language L over $\sum*$, where $\sum$= {a,b} consisting of strings of even length.

c) Define Moore machine.

d) Explain Kleene Closure with one example.

e) Identify the Useless symbols from the following grammar

A→AA| 1A0| B| 0A1| 01

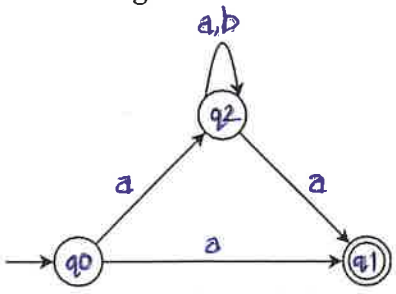
C→0A|1A

f) Define Turing Machine

g) What is Sentential Form? Give an example.

Q.2 **Attempt any five questions:** **[3 x 5 =15]**

a) Convert the following NFA to DFA



b) Let S and T are the sets. Is the following True? Justify
$S^* + T^* = (S + T)^*$

c) Write a regular expression to denote a language L over $\sum^*$, where $\sum$= {0,1} with at least two consecutive 1's

d) Show that $(a^*b^*)^* = (a + b)^*$.

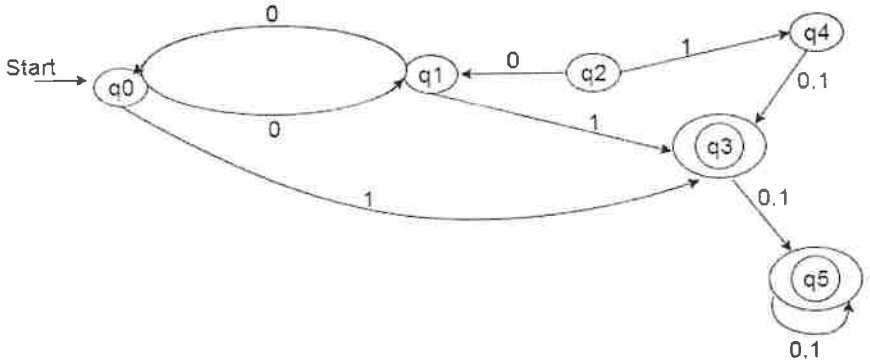
e) Compare PDA with FSM

f) Write a CFG to represent a language defined by the regular expression $(100 + 011)^*$.

g) Explain the decision problems and Undecidable problems.

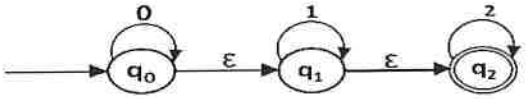
Q.3 Attempt any five questions: [5 x 5 =25]

a) Minimize the following DFA



b) Design a PDA to check the well-formedness of parenthesis.

c) Convert the following NFA with € to DFA



d) Explain in brief Chomsky Hierarchy.

e) Construct a Moore machine that prints 'a' whenever the sequence '01' is encountered in any input binary string otherwise outputs 'b'.

f) Convert following CFG into GNF.
S→AB
A→BS|b
B→SA|a

g) Show that L={$ww \mid w \in \{a,b\}^*$ } is not regular.

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Deccan Education Society's

Fergusson College (Autonomous), Pune-4

T.Y.B.Sc. (Semester V)

Subject: Computer Science

(CSC3511) Software Testing and Automation Tools (2019 pattern)

Time: 2 ½ Hrs. **Max. Marks: 50**

Instruction to candidates:

i) **All questions are compulsory**
ii) **Figures to the right indicate full marks**
iii) **Use of statistical tables and scientific calculators is allowed.**

Q.1 **Attempt any <u>five</u> questions:** **[2 x 5 =10]**

a) What is Defect?

b) Define System Testing.

c) "Top-down and Bottom-up approach is applicable in Integration Testing", State whether true/false. Justify.

d) Write the pre-condition of Online Product Ordering process.

e) What is State Transition Testing?

f) What is a purpose of Test Case Designing?

g) List any two Automation Testing Tools.

Q.2 **Attempt any five questions:** **[3 x 5 =15]**

a) List the advantages of Software Testing.

b) Write a short note on workflow of Unit Testing.

c) What is Performance Testing? Explain its advantages.

d) Write a short note on RTM.

e) What is Decision Table Testing? Explain in short.

f) Describe the Test Case Template with example.

g) Write a short note on e-Commerce domain.

Q.3 **Attempt any five questions:** **[5 x 5 =25]**

a) Explain Software Testing Life Cycle in detail.

b) Explain different types of defects with example.

c) Differentiate between White box and black box testing.

d) Explain best practices to achieve Test Documentation.

e) In the College Admission process, a college gives admissions to students based upon their percentage. Percentage field is considered which will accept percentage only between 50 to 90 %, more and even less than not be accepted, and application will redirect user to an error page. Write an equivalence partitioning test case design for the same.

f) Prepare a Test Case for the Desktop application for the Web Application with user requirement specification.

g) Explain different Test Cases which can be designed for Finance Application Domain.

1/12/22 DLC

Fergusson College (Autonomous), Pune-4

F.Y. B.Sc. (Computer Science) Semester - I

Subject: Electronics

(ELC1102) Sequential Logic Circuits (2019 pattern)

2 Credits

[Time: 2 Hours 30 Minutes] **[Max. Marks : 50]**

Instructions to the candidates:

1) All questions are compulsory.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to the right side indicate full marks.
4) Use of only Non-Programmable calculator is allowed.

Q. 1) Answer the following questions (Any Five) **Two Marks Each** **[10 M]**

a) Draw the logic diagram of S-R Latch and write its truth table.

b) Describe 3-bit Serial In Serial Out Shift right register with the block diagram and truth table.

c) Define 1) Counter and 2) Shit Register, in the sequential

d) Describe Synchronous counter.

e) List the different types of RAM

f) Describe Combinational Circuit.

Q. 2) Answer the following questions (Any Four) **Three Marks Each** **[12 M]**

a) Explain clock pulse with neat waveform.

b) Discuss the basic building block of a counter with its truth table and timing diagram.

c) Discuss the construction and working of 4 bit asynchronous Up counter.

d) Explain the construction of 'D' Flip Flop using logic gates. Write its truth table.

e) Design S-R Flip Flop using NAND gates and explain the function of its Preset and Clear inputs.

Q. 3) Answer the following questions (Any Three) **Three Marks Each** **[9 M]**

a) Illustrate Vertical memory capacity expansion.

b) Justify that the inputs J=1 and K=1 produces race around condition in J-K Flip Flop.

c) Calculate the amount of time 4 bits take to get entered into 4 bit Serial In Parallel Out (SIPO) Shift Register if the applied clock frequency is of 10 KHz.

d) Illustrate construction and working of SISO shift register with truth table and timing diagram.

Q. 4) Answer the following questions (Any Two) **Three Marks Each** **[6 M]**

a) Analyze the working of IC 7490 as MOD 5 Counter.

b) Explain 4 level memory hierarchy used in Computer Organization.

c) Explain J-K Flip Flop with neat logic diagram and truth table.

Q. 5) Answer the following questions (Any Two) **Four Marks Each** **[8 M]**

a) Illustrate the construction and working of D latch using NOR gates.

b) Draw the internal block diagram of IC 7490 and Justify that the Master SET (MS1 & MS2) inputs are used to get output count (1 0 0 1) in IC 7490.

c) Illustrate the computer system Bus (Data, Address and Control) Structure.

Q. 6) Answer the following questions (Any One) **Five Marks Each** **[5 M]**

a) Construct J-K Master Slave Flip Flop using NAND gates and explain its working with truth table.

b) Construct and test 4 bit Universal Shift Register.

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Deccan Education Society's

Fergusson College (Autonomous), Pune-4

T.Y.B.Sc. (Semester V)

Subject: Computer Science

(CSC3504) Web Development - I (2019 pattern)

Time: 2 ½ hours **Max. Marks: 50**

Instruction to candidates:

i) **All questions are compulsory.**

ii) **Figures to the right indicate full marks.**

Q.1 **Attempt any five questions:** **[2 x 5 =10]**

a) Define cellspacing and cellpadding.

b) What is the use of prompt box in JavaScript?

c) What is JSON? Explain rules for syntax.

d) What is hidden field in HTML?

e) How to define multiline string in PHP? Give example.

f) What is purpose of input type range? Give example with all attributes.

g) How to find number of parameters passed to the function in PHP? Give example.

Q.2 **Attempt any five questions:** **[3 x 5 =15]**

a) Explain Following HTML tags

i. <img>
ii.
iii.

b) Write syntax and example of while loop in JavaScript.

c) Explain fixed positioning with example.

d) Write a java script to calculate the area of triangle.

e) Write a CSS code to display a link without underline text.

f) Write anonymous function to find minimum of two integer numbers.

g) What are different ways to compare strings in PHP? Give example.

Q.3 **Attempt any <u>five</u> questions:** **[5 x 5 =25]**

a) Explain features of HTML.

b) Explain array data type used in Java Script with example.

c) Explain the following CSS properties with example:

i. background-repeat
ii. text-align
iii. padding-right
iv. margin-bottom
v. color

d) Write a HTML code to display a student registration form with the name field, address field, phone field, email field and one submit button.

e) Write HTML code to design a form to accept a radius from user. Write a JavaScript to calculate area of circle.

f) Write a PHP script to accept a string from user with '|' (separation between words) symbol between two words. Print the decomposed string.

g) Explain the following functions with syntax and example:

i. ksort()
ii. array_slice()
iii. in_array()
iv. array_flip()
v. array_sum()

06 DEC 2022

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Deccan Education Society's
Fergusson College (Autonomous), Pune-4

T.Y.B.Sc. (Semester V)
Subject: Computer Science
(CSC3512) Python Programming (2019 pattern)

Time: 2 Hrs 30 Min. **Max. Marks: 50**

Instruction to candidates:

i) **All questions are compulsory**
ii) **Figures to the right indicate full marks**

Q.1 **Attempt any <u>five</u> questions:** **[2 x 5 =10]**

a) List the different data types in Python.

b) What do you mean by unpacking a tuple? State an example

c) How is the constructor created in Python? State an example

d) How to create the following given Messagebox widget?

e) Explain the purpose of the connect() method.

f) What are Matplotlib Markers? State an example.

g) State with example the different methods to read the contents of a file.

Q.2 **Attempt any <u>five</u> questions:** **[3 x 5 =15]**

a) Write a Python program to check if a number is prime or not.

b) Explain the slice operator with syntax and suitable example.

c) What do you mean by a DataFrame? Explain with suitable example.

d) Explain the purpose of mainloop() with suitable example.

e) What is the use of Cursor object? Give the suitable example.

f) Explain the technique of removing Null values for data cleaning

g) Explain the purpose of the super() method with syntax and suitable example.

Q.3 Attempt any <u>five</u> questions: **[5 x 5 =25]**

a) Explain the various types of argument passing in Python with suitable example

b) Create a data set for the game of Hockey with data fields like Year, Number of tournaments in that year, Number of wins, Number of loss and number of draws. Show this data in a DataFrame. Also plot Bar graph to show number of tournaments played in each year

c) What is the Set data structure? Explain any two set operations with syntax and suitable example

d) Create a class Employee with attributes emp_id, name. Accept the details using the appropriate constructor. Derive a class Manager from Employee with number of departments managed by the manager and salary. Accept the details and display all information of the student.

e) Explain in detail the steps to create the tkinter application.

f) How to open a file in Python? Explain various modes of opening a file with syntax and suitable example.

g) Write the use of the following methods along with the syntax and example.
i) connect( )
ii) cursor( )
iii) execute( )
iv) commit( )