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| Course Code | | Course Title | L | T | P | C | QP |
| **BBSES1150** | | **Programming for Problem Solving Laboratory** | **0** | **0** | **4** | **2** |  |
| Pre -Requisite: Basics of Computer Science | | | | | | | |
| **Course Educational Objective** | | | | | | | |
| CEO1: To develop programs for problems on different applications of array, functions, pointers and structure. | | | | | | | |
| CEO2: To analyse different problems by comparing and implementing in programming. | | | | | | | |
| **Course Outcome: student can able to** | | | | | | | |
| CO1 | Memorize features of structure oriented programming and describe control statements, arrays, structures and pointers. | | | | | | | |
| CO2 | Classify various types of statements and demonstrate programs on control structures, arrays, functions, pointers and structures. | | | | | | | |
| CO3 | Solve problems using different programming logics and can able to discover better solutions. | | | | | | | |
| CO4 | Analyse different programs by experimenting on them and estimating their efficiency. | | | | | | | |
| CO5 | Evaluate complex programs by verifying their logics and justify their results. | | | | | | | |
| CO6 | Develop applications and projects using various features of structure oriented programming. | | | | | | | |
| **Lab Experiment 1: Familiarization with programming environment**  1) Introduction to OS: Before starting experiments explain the facilities and operations of OS.  2) Introduction to the C compiler, Compilation and Execution Process & writing simple programs. | | | | | | | |
| **Lab Experiment 2: Simple computational problems using arithmetic expressions.**  1) Write a program to input radius of a circle and Find the area, perimeter of it.  2) Write a program to input two numbers and swap them using an intermediate variable.  3) Write a program to input two float values and find their sum  4) Write a program to input 2 sides i.e: length and breadth of a rectangle. Find the area and perimeter of it. | | | | | | | |
| **Lab Experiment 3:** **Simple computational problems using arithmetic expressions.**  1) Write a program to accept Fahrenheit and calculate its equivalent Celsius.  2) Write a program to input three unequal numbers and find the greatest using conditional operator.  3) write a program to find simple interest when principle amount, no. of terms and rate of interest given.  [ Given formula: si=(p\*t\*r)/100 ]  4) write a program to find the area of a triangle when the 3 sides of it given as input.  [ Given formula: s=(a+b+c)/2 and area= sqrt(s\*(s-a)\*(s-b)\*(s-c)) ] | | | | | | | |
| **Lab Experiment 4: Simple computational problems using arithmetic expressions.**  1) Write a program to input three unequal integers and find the largest number using conditional operator.  2) Apply Pythagorean theorem for finding the distance between two points i.e. side ‘a’ when the two sides namely ‘b’, ‘c’ are given as input. [ Given formula is a=sqrt(b2+c2) ]  3) John, Ram and shah were fishing in a river bank. Input the no. of fishes caught by each person and display who have caught more fishes (use conditional operator).  4) A boy is running in a circular playground having radius R given input. What will be the distance and displacement from one end to other end of ground? [Formula distance=Pi\*R and Displacement=2\*R] | | | | | | | |
| **Lab Experiment 5: Problems involving using if statement**  1) In your garden two flower plants of rose and lily are growing. Input the growth of each plant in centimetres. Display the plant whose height is more. (use if..else)  2) In a software company a project team of 3 members namely manvi, shyam and William. Input their job experience in no. of years. The team lead must have more experience. Display who can be team lead. (use if..else)  3) Write a program to input 3 co-efficient values and find the real roots of quadratic equation.  4) Write a program input a digit within 0 to o6. Display week day example: 0 for Sunday, 1 for Monday etc (use else if ladder). | | | | | | | |
| **Lab Experiment 6: Problems involving using switch..case**  1) Write a program to input a lower case alphabet and test whether it is vowel or consonant.( using else..if and switch both)  2) Write a program to input an arithmetic operator and two operands. Calculate and display the result as per the given operator using switch..case.  3) Write a program to find the greatest among three numbers.(using else..if and switch both) | | | | | | | |
| **Lab Experiment 7: Programming with while loop and do..while loop:**  1) Write a program to input a number and test whether it is prime number or not using while statement.  2) Write a program to test a number is perfect or not using while statement.  (ex: The perfect number is 6, which is the sum of 1, 2, and 3. Other perfect numbers are 28, 496, and 8,128. )  3) Write a program to input a positive number and test whether it is palindrome or not using do..while statement.  4) Write a program to accept a positive integer and test it for Armstrong or not using do..while statement. | | | | | | | |
| **Lab Experiment 8: Programming with For loops and nested Loop:**  1) The length of two rods are given as input in meters. The rods are to be cut into pieces of equal length. Find the maximum length of each piece. (use for loop)  2) Write a program to generate a series of Fibonacci numbers using for statement  3) Write a program to calculate the following sum using nested for statement:  Sum = 1-(x2)/2! +( x4)/4! – (x6)/6! + (x8)/8! – (x10)/10!....(xn/n!)  4) Write a program to generate the following pyramid using nested for statement:  1  1 2 1  1 2 3 2 1  1 2 3 4 3 2 1 | | | | | | | |
| **Lab Experiment 9: Programming with 1D Array and 2D Array**  1) Write a program to accept 10 integers in to an array and find largest and smallest integers present in them.  2) Write a program to input 10 numbers into an array. Find how many prime numbers exist in the array.  3) Write a program to input values into a square matrix of size 3X3. Display the transpose of the matrix.  4) Write a program to input elements into two matrices A[3][4], B[4][3]. Multiply A and B store result into matrix C[3][3]. Display the resultant matrix C. | | | | | | | |
| **Lab Experiment 10: Programming with Strings Handling Operations**  **1)** Write a program to input a string and find the frequency of a given character in it.  2) Write a program to input two strings and compare them for equality without using library function.  3) Write a program to input a string and test it for palindrome or not using library functions. | | | | | | | |
| **Lab Experiment 11: Programming with User Defined Functions**  1) Write a C program which contains three UDF’s namely add(), subtract() and multiply(). Each function accepts two integers as their arguments and calculate and return the results.  2) Write a program to create an UDF and test a number is prime or not.  3) Write a program to create an UDF which accepts an array of 10 integers and find the largest element and smallest element present in the array. | | | | | | | |
| **Lab Experiment 12:** **Programming with Recursive Functions**  1) Write a program to find the factorial of a number using recursive function.  2) Write a program to accept 10 elements into an integer array. Find the largest element present using recursive function.  3) Write a program to generate Fibonacci series using a recursive function. | | | | | | | |
| **Lab Experiment 13:** **Programming with Pointers**  1) Write a program to swap two numbers using User Defined Function by applying call by address concept.  2) Write a program to perform matrix addition. Create an UDF which accepts the two matrices using two pointers and performs matrix addition.  3) Write a program to store N integer values using dynamic memory allocation. Then find the largest, smallest present in it using User Defined Function.  4) Write a program to store N integers using dynamic memory allocation. Find the average value of the integers using a user defined function. | | | | | | | |
| **Lab Experiment 14: Programming with Structures**  1) Write a program create a structure PRODUCT having members Product no, Name and Price. Using a pointer Input 5 product details into a structure array and then display those products whose price is >1000 rupees.  2) Write a program to store 11 cricket players’ details into an array of structure. The structure having member’s player name, team name and batting average. Displays the name of players whose batting average is >=30.  3) Write a program to create a structure EMPLOYEE to store N employee details using DMA having members: employee no, name, salary. Create a function which displays only those employee names whose salary>=50000.  4) Write a program to create a structure for store library books using a structure having members book no, name, author, price. Store N books details using dynamic memory allocation. Create an UDF which accepts these books details using pointer and then display only those books whose cost>=1000. | | | | | | | |
| **Topic Beyond Syllabus**  2) Write a program to input a set of numbers into a file called NUM.TXT. Display only the even numbers present in the file and also display their sum.  3) Write a program to store a paragraph into a file A.TXT using command line arguments and then create a copy of it with name B.TXT. | | | | | | | |
| **Teaching Methods: Chalk& Board/ PPT/Video Lecture**   * A case study can be given to each student for each UNIT. * A Mini Project can be given which the student has to complete during the semester break. | | | | | | | |
| **Text Books:**   1. E. Balaguruswamy, Programming in ANSI C, 7th edition, Tata McGraw-Hill 2. Let us ‘C’ by Yashwant Kanethekar, 16th edition, BPB Publications 3. Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill | | | | | | | |
| **References:**   1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,2nd edition, Prentice   Hall of India   1. Programming in C, by Reema Thareja, 2nd edition, OUP India 2. C Programming and Coding by swati saxena, BPB Publications | | | | | | | |

**CO-PO MAPPING**

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|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |  |
| CO1 | 3 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |  |
| CO2 | 2 | 3 | 2 | 1 |  |  |  |  |  |  |  |  |  |
| CO3 | 2 | 2 | 3 | 3 | 1 |  |  |  |  |  |  |  |  |
| CO4 | 2 | 1 | 3 | 3 | 1 |  |  |  | 1 |  |  |  |  |
| CO5 | 0 | 0 | 2 | 2 |  |  |  |  | 1 | 1 |  |  |  |
| CO6 | 0 | 0 | 1 | 1 |  |  |  |  | 1 | 1 |  |  |  |
|  | 1.5 | 1.33 | 2 | 1.83 | 0.33 |  |  |  | 0.5 | 0.33 |  |  | 1.12 |

[ HIGH-3 MID-2 LOW -1]