MAHARASHTRA STATE BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION, PUNE – 411 005

Computer Science D-9 (Paper I)

H.S.C. Board Practical Examination Slips

Experiment No. 1

a) Write a program in C++ that first initialises an array of given 10 real numbers. The program must sort numbers in ascending/descending order using **Bubble-Sort** method. It should print the given list of numbers as well as the sorted list. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

OR

a) Write a function in C++ that exchanges data (passing by reference) using **swap** function to interchange the given two numbers. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. The output must list the given numbers before as well as after swapping. (5)

OR

a) Write a program in C++ that first initialises an array of given 10 sorted real numbers. The program must verify whether a given element belongs this array or not, using **Binary Search** technique. The element (to be searched) is to be entered at the time of execution. If the number is found, the program should print its position in the array otherwise it should print "The number is not found." (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output for successful as well as unsuccessful search. (5)

OR

a) Write a program in C++ that first initialises an array of five given numbers (short/ float/ double). The program must add these numbers by traversing this array with a pointer. The output should print the starting address of the array with the size of the number (in bytes) to whit it points. The program must also print the sum and pointer address with the addition of every number as well as the ending address. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

OR

a) Write a function in C++ to input the given string (including spaces) and reverse it using a function which locates the end of the string and swaps the first character with the last character, the second character with the second-last character and so on. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. The output must include the given string as well as the reversed string. (5)

Experiment No. 2

a) Write a program in C++, which defines a `node` class, each of whose objects contain an integer data number and a next pointer. The program should allow the user to create a linked list in reverse and then traverse the list printing each data value (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output consisting of the numbers input in the reverse order. (5)

OR

a) Write a program in C++ with a `ratio` class using member functions like `assign()` function to initialise its member data (integer numerator and denominator), `convert()` function to convert the ratio into double, `invert()` function to get the inverse of the ratio and `print()` function to print the ratio and its reciprocal. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 3

a) Implement a `Circle` class in C++. Each object of this class will represent a circle, storing its radius and x and y co-ordinates of its centre as `float`s. Include a default constructor, access functions, an `area()` function and a `circumference()` function. The program must print the co-ordinates with radius, area and circumference of the circle. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 4

a) Write a program in C++ that initialises a `Ratio` class with no parameters as a default constructor. Add a constructor having no parameters that initialises the declared object with the default integer values __ and __ . Add another constructor that has one integer parameter. This constructor must initialise the object to be the fractional equivalent of that integer. The output should print the ratio as per the constructors. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output. (5)

OR

a) Write a program in C++ that initialises a `Ratio` class with no parameters as a default constructor. The program must print the message **"OBJECT IS BORN"** during initialisation. It should display the message **"NOW X IS ALIVE"**, when the first member function `Ratio x` is called. The program must display **"OBJECT DIES"** when the class destructor is called for the object when it reaches the end of its scope. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 5

a) Write a program in C++ with a complex constructor to add the given two complex numbers A = _____ and B = _____. The program should print the given complex numbers and their sum. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output. (5)

OR

a) Write a program in C++ to implement the addition and division operator for the `Ratio` class. Hence print the given two ratios x and y, their sum (x + y) and their division (x ÷ y). (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 6

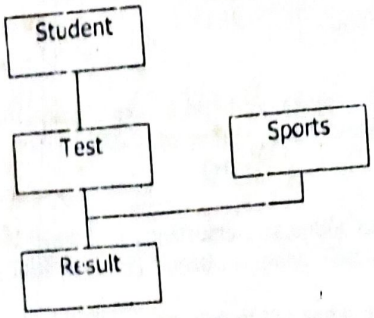
a) Define two classes Polar and Rectangle in C++ to represent points in the polar and rectangular systems. Use conversion routines from one system to the other. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)

c) Obtain a hardcopy of the program listing as well as output for at least one value conversion from rectangular to polar and vice-versa. (5)

riment No. 7

a) Write a program in C++ to implement the following class hierarchy: Class Student to obtain Roll Number, Class Test to obtain marks scored in two different subjects, Class Sports to obtain weightage (marks) in sports and Class Result to calculate the total marks. The program must print the roll number, individual marks obtained in two subjects, sports and total marks. (15)



b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

OR

a) Write a program in C++ using virtual function. The program must declare p to be a pointer to objects of the base class Person. First, the program must assign p to point an instance x (name of the person eg. "BOB") of class Person. The program must then assign p to point at an instance y (name of the student, eg. "TOM") of the derived class Student. (15)
Define a print() function in the base class such that it invokes the same base class function to print the name of the person by default. The second call for the same should evoke the derived class function to print the name of the student.

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 8

a) Write a program in C++ to read the name of a country from one text file and name of its corresponding capital city from another text file. The program must display the country name and indicate its corresponding capital (for at least five countries) in the output. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing as well as output. (5)

Experiment No. 9

a) Write a program in Visual Basic that calculates area and selection of two shapes, Circle and Rectangle. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write Prepare a project in Visual Basic that will display a picture with red color as background on form_load event. When the drag-drop operation is carried out, the background color must change to green and when the drag-over operation is carried out, the background color must change to blue. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write a program in Visual Basic that creates a Simple form, which asks the user to enter Name of the Student. Marks obtained in Subject 1, Subject 2, and Subject 3. As the name, and marks obtained in the various subjects are entered, the pointer should automatically point at the next field to be entered. At the end it should move to the command button. When the command button is clicked, the program must save the record. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write a program in Visual Basic to prepare a list of items in one List Box (Say computers & peripherals). After selecting the items, the selection must be listed in second list which will be automatically sorted. The program must also provide options by which will enable users to add the items from the first or second list if needed, as well as options to remove items from the list. (15)

b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Experiment No. 10

a) Write a program in Visual Basic to create a Text Editor, which has the following Menu options (15)

File	Edit
→ New	→ Cut
→ Open	→ Copy
→ Save	→ Paste
→ Close	

b) Enter the program and verify proper execution of the same on the Computer using text or text file. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write a program in Visual Basic that constructs a scientific calculator with SIN, COS, TAN, LOG, 1/X (reciprocal) and SQR (Square Root) functions only. Display the error messages as and when required. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Experiment No. 11

a) Write a program in Visual Basic that accepts Name of the Person, Date of Birth and Telephone Number as data during execution. The program must check the validity of contents and must display an appropriate error message along with appropriate corrective suggestions if data is incorrectly entered. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Experiment No. 12

a) Write a program in Visual Basic that accepts Name of the Person, Date of Birth and Telephone Number as data during execution. The program must check the validity of contents and must display an appropriate error message along with appropriate corrective suggestions if data is incorrectly entered. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write a program in Visual Basic to find the sum of first 100 numbers entered **using Do loop**. (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

OR

a) Write a program in Visual Basic Using **Case condition** that accepts the marks out of 100 of six students in six subjects during execution. The program should display the Class obtained by the student based on the following conditions: (15)
1] If student has secured less than 40% in any subject then that student is declared Failed.
2] If the student secures more than 40% and less than 60% aggregate and has secured at least 40% in each subject, then he/she will be awarded Second Class.
3] If the student secures 60% aggregate and has secured at least 40% in each subject, then he/she will be awarded First Class.
(Enter Marks for three subjects only)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Experiment No. 13

a) Write a program in Visual Basic which accepts a Person's name, Telephone number and e-mail address. Enter the information for 5 different persons. Using TAB properties, display the information. (15)
b) Enter the program and verify proper execution of the same on the Computer (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Experiment No. 14

a) Create a graphic editor using Visual Basic, which has the following functions: change color change line width, fill color, change border color etc. (Select any three properties to change). (15)
b) Enter the program and verify proper execution of the same on the Computer. (10)
c) Obtain a hardcopy of the program listing by printing the FRM file. (5)

Computer Science D-9 (Paper II)
H.S.C. Board Practical Examination Slips

Experiment No. 1

A program is stored from memory location ____ to ____. (10)

a) Copy the contents of these memory locations on paper and disassemble the program using op-code sheet. (10)

b) Draw the flowchart and write the working of the program. (10)

Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results.

Experiment No. 2

a). Write a program that adds the contents of a block of memory using the DAD instruction. Block length is stored at _____ and starting address of block is _____. Store the TWO-byte result below the end of the block. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the program. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) Write a program that subtracts the number stored in _____ from the number stored in _____. Store the absolute difference in memory location _____ as result. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the program for a positive as well as a negative difference. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) Write a program that adds a 4 byte integer stored in consecutive memory locations starting from _____ beginning with Lower order byte to another 4 byte integer stored in consecutive memory locations starting from _____ beginning with Lower order byte. Store the result in consecutive memory locations staring from _____. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the program. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

Experiment No. 3

a) Write a program that multiplies two 1-byte hex numbers stored in consecutive memory locations starting from _____. Store the two-byte result in consecutive memory locations starting from _____ beginning with lower order byte. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the program. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) Write a program that divides two 1-byte hex numbers where the dividend is stored in _____ and the divisor is stored in _____. Store the quotient and the remainder in the next consecutive memory locations respectively. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the program. Write the contents of data memory locations before and after execution as well (5)

as the content of the register used in the program after execution & also the bit content of all five flag individually Verify the result.

Experiment No. 4

a) Write a program that adds the BCD contents of a block of memory. Block length in hex not exceeding $63_H = (99_{10})$ is stored at _____ and starting address of block is _____. Store the BCD sum as result starting from memory location _____. (5)
b) Enter the program on the microprocessor kit. (5)
c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results.

Experiment No. 5

a) Write a program that uses the Keyboard subroutine having starting address _____ to accept two digits from the keypad, store them separately in consecutive memory locations _____ and _____ and store them as one byte data at memory location _____. (20)
b) Enter the program on the microprocessor kit. (5)
c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and verify the results. (5)

Experiment No. 6

a) Write a program for using the microprocessor kit as a Calculator that would accept two digit decimal numbers, display the numbers input as well as simultaneously display the BCD sum on the display. Use monitor routines to clear the display, input the numbers and output the numbers to the display. Necessary information about the routines will be supplied by the examiners. (20)
b) Enter the program on the microprocessor kit. (5)
c) Demonstrate execution of the same for adding any decimal numbers and write down the limitations of the program. (5)

Experiment No. 7

a) Write a program to flash a message for _____ times with a time interval of _____ seconds between two flashes. Use necessary monitor routines supplied by the examiners. (10)
b) Enter and execute the program on the microprocessor kit.
c) Draw the flowchart and explain the working of the program to the examiner. (10)
(10)

Experiment No. 8

a) A block of data is stored in memory locations from _____ to _____. Write a program to transfer the data in reverse order to memory locations starting from _____. (20)
b) Enter the program on the microprocessor kit. (5)
c) Execute the same. Write the contents of both data blocks before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) A block of data is stored in memory locations from _____ to _____. Another block of data having the same length is stored in memory locations starting from _____. Write a program to exchange the contents of these two blocks. (20)
b) Enter the program on the microprocessor kit. (5)
c) Execute the same. Write the contents of both data blocks before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

Experiment No. 9

a) A block of data is stored in memory locations from _____ to _____. Write a program to find the smallest as well as greatest number from this block **using Linear Search.** Store the results immediately after the end of the block. (20)
b) Enter the program on the microprocessor kit. (5)
c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

Rao IIT Academy
Symbol of Excellence and Perfection
SANTACRUZ | ANDHERI | GOREGAON | KANDIVALI (E) | KANDIVALI (W) | BORIVALI | BHAYANDER
SION | THANE | LOKHANDWALA (THANE) | DOMBIVALI

Experiment No. 10

a) A block of data is stored in memory locations from _____. The length of the block is stored at _____. Write a program that counts the occurrence of the number ____ in the given Block. Store the result in _____. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) A block of data is stored in memory locations from _____. The length of the block is stored at _____. Write a program that searches for the first occurrence of the data byte ____ in the given block. Store the address of this occurrence in the HL pair. If number is not found, then HL pair must contain _____. (20)

b) Enter the program on the microprocessor kit. (5)

c) Write the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) A block of data is stored in memory locations from _____ to _____. Write a program to find the **number of odd as well as even numbers** in the given block. Store the results immediately after the end of the block. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

Experiment No. 11

a) Write a program that separates the two nibbles of a number stored in _____ and stores the same in memory locations _____ and _____. The program must also multiply the two nibbles and store the product in _____. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

OR

a) A 4-byte hex number beginning with lower order byte is stored from memory locations _____. Write a program that checks whether the given number **considered in hex**, is palindrome or not. If the number is palindrome then memory location _____ must contain 00_H else FF_H. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

(For example, the hex integer **AB0550BA**$_H$ is palindrome.)

OR

a) Write a program that multiplies two 1-byte hex numbers stored in consecutive memory locations **by rotation**. Store the two-byte result in consecutive memory locations starting from ____ beginning with Lower Order Byte. (20)

b) Enter the program on the microprocessor kit. (5)

c) Execute the same. Write the contents of data memory locations before and after execution as well as the contents of the registers used in the program after execution and also the bit contents of all five flags individually. Verify the results. (5)

Rao IIT Academy
Symbol of Excellence and Perfection
SION | THANE | LOKHANDWALA

Experiment No. 12

a) Write a program that performs the following in the given sequential order: (1
   1. Clears all the flags.
   2. Loads 00_H in the Accumulator, stores all flags in the stack. This should be done to demonstrate (using stack) that flags are not affected by data transfer instructions.
   3. Logically OR the accumulator with itself to set zero flag and stores all the flags in the stack. This should be done to demonstrate (using stack) that flags are affected by logic instructions.

b) Enter the program on the microprocessor kit. (5
c) Execute the same. Write the contents of data memory locations (stack in this case) before and after execution as well as the contents of the registers used in the program after execution. Verify the results. (5
d) Draw a flowchart and write the working of the program. (5

Experiment No. 13

a) Write a program to convert a 2-digit BCD number stored at memory location _____ into its binary equivalent and store the binary value in memory location _____. (10
b) Enter and execute the program on the microprocessor kit. (10)
c) Write the working of the program. (10)

OR

a) Write a program to convert a binary number stored at memory location _____ into its BCD equivalent, and store the three digit BCD number in two consecutive memory locations starting at _____. (10)
b) Enter and execute the program on the microprocessor kit. (10)
c) Write the working of the program. (10)

OR

a) A 2-digit hex number is stored in memory location _____. Write a program to convert each digit of this number into ASCII equivalent, and store the ASCII codes in memory locations ____ and ____. (10)
b) Enter and execute the program on the microprocessor kit. (10)
c) Write the working of the program. (10)

OR

a) Two ASCII codes for hexadecimal digits are stored at memory locations ____ and ____. Write a program to convert the codes into their hexadecimal equivalents. Store the 2 respective hexadecimal equivalents as data in a single memory location _____. (10)
b) Enter and execute the program on the microprocessor kit. (10)
c) Write the working of the program. (10)