

BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-II

ASSIGNMENTS

(July - 2016 & January - 2017)

MCS-011, MCS-012, MCS-013, MCS-015, BCSL-021, BCSL-022



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	:	MCS-011
Course Title	:	Problem Solving and Programming
Assignment Number	:	BCA(2)/011/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session) 15th April, 2017 (For January 2017 Session)

There are six questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Insert comments in the coding for better understanding.

1. Mention the type of applications which can be developed using C language. Also, list the latest C compilers that are available in the market by giving the complete details like the name of the compiler, version, vendor's name, DOS based /WINDOWS based / Others, year of release, etc.. *(10 Marks)*

2. Draw a flow chart and write a corresponding interactive program which prompts the user with the following options on the opening menu: *(10 Marks)*

- 1) Subtract two integers
- 2) Compare two integers to find the smallest
- 3) Test an integer for odd or even
- 4) Quit

Enter your choice:

If an "1" is entered, prompt for the input of two integers and display their difference. If "2" is entered, prompt for two integers and display the smaller of the two. If "3" is entered, prompt the user for one integer and print out if it is odd or even. If "4" is entered, exit the program. If the user enters any letters or numbers other than the choice, redisplay the prompt. All output should go to the terminal and all input should come from the keyboard.

3. Write an interactive program using strings which: *(10 Marks)*

- a) gets a filename from the standard input (keyboard) or a file
- b) gets a mode (read or write) from the same source and,
- c) copies the contents of the input file to:
 - (i) the standard output if the input is from a file

OR

- (ii) to the file specified in a) if the mode from b) is writeIf the file won't open, direct the input/output to the corresponding standard file (stdin/stdout).

4. Draw a flowchart and write an interactive C program that prints a **power** table for a specified range of integers. The user specifies the starting and ending integer on the command line along with the max power to compute for each integer. An example is included below: (20 Marks)

Example:

Starting Integer: 2

Ending Integer: 4

Maximum Power to be computed: 5

Output

Num	Powers (1 - 5)				
2	2	4	8	16	32
3	9	27	81	243	729
4	16	64	256	1024	4096

Your program should use the **pow()** function along with casting of this function's arguments and output.

5. Write an interactive C program to simulate the evaluation scheme for MCA (First semester) for 10 students. Each course should have both the components (Assignment as well as Term End Examination). (10 Marks)

6. Write a program to **crypt** its input according to a specified transformation scheme. The transformation scheme will consist of two strings: a string of characters and then a string of replacement characters. The idea is that your program replaces every instance of the i^{th} character in the initial string with the $(i+1)^{\text{th}}$ character (of English alphabets) in the replacement string. It follows a cyclic pattern. If alphabet **z** is met it starts with alphabet **a**. When no substitution is defined for a character, the program just passes it through to the output unchanged. Blank spaces and the other symbols remains the same. The program should inform the user of any errors in the transformation scheme. Your program should display the strings before and after the substitutions in the corresponding **2 files** named **bcrypt** and **acrypt**. (20 Marks)

Example:

Original String: I know C programming.

String after the transformation: J lopx D qsphsbnnjoh.

Course Code	:	MCS-012
Course Title	:	Computer Organisation and Assembly Language Programming
Assignment Number	:	BCA(2)/012/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session) 15th April, 2017 (For January 2017 Session)

There are four questions in this assignment, which carries 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words. Make suitable assumption, if any.

1. (Covers Block 1)

- (a) How can you represent a negative integer in a computer system? (2 Marks)
If 8 bits (including one sign bit) are to be used to represent integers in binary 2's complement notation, then what are the possible minimum and maximum number that can be represented? Perform the following arithmetic operations using signed 2's complement, 8 bit representation. (Please note that the numbers given below are in decimal notation)

- i) Subtract 198 from -98
- ii) Add 124 and 142

Please indicate the overflow if it is occurs. How have you identified the overflow?

- (b) Perform the following conversion of numbers: (2 Marks)

- (i) Decimal $(2050)_{10}$ to hexadecimal
- (ii) Hexadecimal $(19BACDFE)_H$ into Octal.
- (iii) ASCII string "AssignMenT" into UTF 16
- (iv) Octal $(547561)_O$ into Hexadecimal

- (c) A combinational circuit is to be designed that counts the number of occurrences of 1 bits in a 4 bit input, however, an input 1111 is an invalid input for the circuit and output in such a case will be 00. One valid input for such circuit may be 1110 having the output 11; another valid input may be 1010 with the output 10. Draw the truth table for the circuit. Use the Karnaugh's map to design the circuit and draw it using AND, OR and NOT gates. (4 Marks)

- (d) What is parity bit? Explain how Single Error Correcting (SEC) code uses parity bits. If an 8 bit data 10101010 on transmission is received as 10111010, then how the SEC code will detect and correct this error. (4 Marks)

- (e) Design a two bit counter (a sequential circuit) that counts in reverse order, i.e. from 11 to 00. Thus, the counter states are 11, 10, 01, 00, 11, 10, 01, 00, 11 ... (4 Marks)

You should show the state table, state diagram, the k-map for circuit design and logic diagram of the resultant design using D flip-flop or J-K flip flop.

- (f) Explain the single precision floating point IEEE 754 representation. Give the number ranges that can be represented by this representation. Also, represent the number $(356.122)_{10}$ using IEEE 754 single precision as well as double precision representations. Is the representation of the said number exactly same in the two representations? Explain your answer. (4 Marks)

2. (Covers Block 2)

- (a) How is the word size of RAM and its capacity related to number of addressing bits? A RAM has a capacity of 1M words having the word size of 32 bits and supports byte addressing. (2 Marks)

(i) How many data input and output lines does this RAM need? Explain your answer.

(ii) How many address lines will be needed for this RAM?

- (b) A hypothetical computer has 16 MB RAM and has a word size of 32 bits. It has cache memory having 32 blocks having a block size of 64 bits. Show how the main memory address 100110001111101110111100 will be mapped to a cache address, if (4 Marks)

(i) Direct cache mapping is used

(ii) Associative cache mapping is used

(iii) Two way set associative cache mapping is used.

- (c) Explain the basic features of the three I/O techniques (Programmed I/O, Interrupt driven I/O and DMA) with the help of diagrams. A computer is to be designed for an environment requiring frequent disk transfers. Which of the three I/O techniques is most suitable for this computer? Justify your answer. (4 Marks)

- (d) Consider a file having name *mca.txt* and is of size 20 K. You have a disk having 32 tracks, each track having 16 sectors with each sector being 1K. Assume that disk has three free - continuous clusters of 8 sectors each. How can this file be given the space on the disk? Show the content of FAT after the space allocation to the file. You may make suitable assumptions. You may assume the cluster size as 4 sectors. (4 Marks)

- (e) Explain the following giving their uses and advantages/disadvantages. (6 Marks)

(Word limit for answer of each part is 50 words ONLY)

- (i) DVD
- (ii) Monitor Resolution
- (iii) Non-impact printers
- (iv) Scan codes
- (v) Graphics accelerators
- (vi) SCSI

3. (Covers Block 3)

- (a) A hypothetical machine has 64 general purpose registers of 64 bits each. The machine has 4G word of RAM (assume that each word is of 64 bits and memory is word addressable). The instructions of machine are of fixed format and are 64 bit long. Instructions of the machine consist of operation code, addressing mode specification, one register operand and one memory operand. The machine uses 2 bits to specify addressing mode as given below:

Addressing mode bits	Register Operand	Memory Operand
00	Direct	Direct
01	Direct	Immediate data
10	Register Indirect	Direct
11	Register Indirect	Immediate data

Machine can specify 1024 different operation codes. Assume that the machine has named 5 of its general purpose registers based on their possible role in instruction execution as Program Counter (PC), Accumulator (AC), Memory Address Register (MAR), Instruction Register (IR) , Data Register (DR) and Flag registers (FR). Perform the following tasks for the machine.

- (i) Specify the size of different fields that are needed in the instruction. (You may leave some bits as unused). (2 Marks)
- (ii) Put some valid values in certain registers and memory locations and demonstrate examples of different addressing modes of this machine. (2 Marks)

- (iii) Assuming that the instructions are first fetched to Instruction Register (IR) and the two operands are transferred to AC and DR registers respectively, and result of operation is stored in the AC register; write and explain the sequence of micro-operations that are required for fetch and execute cycles of an ADD instruction having addressing mode bits as 01. Make and state suitable assumptions, if any. (6 Marks)
- (b) Assume that you have a machine as shown in section 3.2.2 of Block 3 having the micro-operations as given in Figure 10 on page 62 of Block 3. Consider that R1 and R2 both are 8 bit registers and contains 11010011 and 10000111 respectively. What will be the values of select inputs, carry-in input and result of operation (including carry out bit) if the following micro-operations are performed? (For each micro-operation you may assume the initial value of R1 and R2 as given above) (2 Marks)
- (i) Subtract with borrow R2 from R1
 - (ii) Exclusive OR of R1 and R2
 - (iii) Shift left R1 twice
 - (iv) Increment R1
- (c) What are the functions of a control unit? Compare and contrast the functioning of hardwired control unit to that of micro-programmed control Unit. (3 Marks)
- (d) Explain the differences between the RISC and CISC machines. Also explain the differences in the pipelining of these two types of machines. (2 Marks)
- (e) Assume that a RISC machine has 256 registers out of which 48 registers are reserved for the Global variables and 64 for Instruction related tasks. This machine has been designed to have 16 registers for storing four input parameters, four output parameters and eight local variables for function call. Explain with the help of a diagram, how the overlapped register window can be implemented in this machine for a function/procedure calls. You must explain how the parameters will be passed when a function calls another function. (3 Marks)

4. (Covers Block 4)

- (a) Write a program in 8086 assembly Language (with proper comments) that accepts a string of four characters entered using the keyboard and checks if all the entered characters are decimal digits. In case all the characters are decimal digits then it converts the entered string into equivalent binary number. Make suitable assumptions, if any. (7 Marks)

- (b) Write a program in 8086 assembly Language (with proper comments) that passes a parameter containing a lower case alphabet to a near procedure named TOUPCASE, which converts it to upper case and returns it to the calling assembly program. Make suitable assumptions, if any. (7 Marks)
- (c) Explain the following in the context of 8086 Microprocessor (6 Marks)
- (i) Use of segment and segment registers
 - (ii) Interrupt vector table and its use
 - (iii) Indirect Addressing Modes of 8086 microprocessor

Course Code	:	MCS-013
Course Title	:	Discrete Mathematics
Assignment Number	:	BCA(2)/013/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15 th October, 2016 (For July 2016 Session) 15 th April, 2017 (For January 2017 Session)

There are eight questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide, for more details.

- What is proposition? Explain whether, $x-y > 5$ is a proposition or not. (2 Marks)
 - Make truth table for followings. (4 Marks)
 - $p \rightarrow (\sim q \vee \sim r) \wedge (\sim p \vee r)$
 - $p \rightarrow (r \vee q) \wedge (\sim p \wedge \sim q)$
 - Draw a Venn diagram to represent followings: (2 Marks)
 - $(A \cup B) \cup (B \cap C)$
 - $(A \cup B) \cap (C \sim A)$
 - Give geometric representation for followings: (2 Marks)
 - $R \times \{4\}$; where R is a natural number
 - $\{2, 2\} \times (2, -4)$
- Write down suitable mathematical statement that can be represented by the following symbolic properties. (2 Marks)
 - $(\exists x) (\forall y) (\exists z) P$
 - $(\forall x) (\exists y) (\exists z) P$
 - Write the following statements in the symbolic form. (2 Marks)
 - Some birds can not fly
 - Nothing is correct
 - What is modus ponens and modus tollens? Write one example of each. (2 Marks)
 - What is relation? Explain equivalence relation with the help of an example. (4 Marks)
- Make logic circuit for the following Boolean expressions: (2 Marks)
 - $(x' y' z) + (xyz)$
 - Find Boolean Expression of Q in the figure given below. (2 Marks)

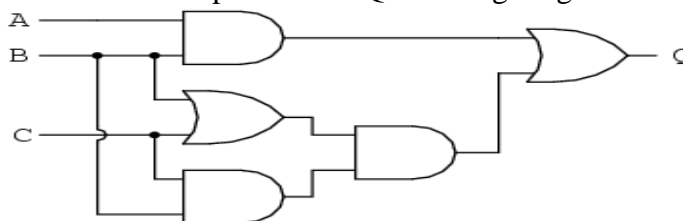


Figure 1: Boolean Circuit

- (c) Find Boolean Expression of Q in the figure given below. (2 Marks)

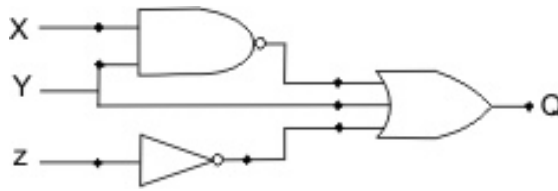


Figure 2: Boolean Circuit

- (d) What is integer partition? Write down all partitions of 8. (4 Marks)
Also find P_8^4 and P_8^7 .
4. (a) How many different committees can be formed of 10 professionals, each containing at least 4 Professors, at least 3 General Managers and 3 Finance Advisors from list of 10 Professors, 12 General Managers and 5 Finance Advisors? (3 Marks)
- (b) There are two mutually exclusive events A and B with $P(A) = 0.5$ and $P(B) = 0.4$. Find the probability of followings: (3 Marks)
- A does not occur
 - Both A and B does not occur
 - Either A or B does not occur
- (c) What is set? Explain the basic properties of sets. (4 Marks)
5. (a) How many words can be formed using letter of **UMBRELLA** using each letter at most once? (2 Marks)
- If each letter must be used,
 - If some or all the letters may be omitted.
- (b) Show using truth that: (2 Marks)
 $(p \rightarrow q) \rightarrow q \Rightarrow p \vee q$
- (c) Explain whether $(p \rightarrow q) \rightarrow (q \rightarrow r)$ is a tautology or not. (2 Marks)
- (d) Prove that: $1 + 2 + 3 + \dots + n = \frac{1}{2}n(n + 1)$ using mathematical induction. (4 Marks)
6. (a) How many ways are there to distribute 15 distinct objects into 5 distinct boxes with: (2 Marks)
- At least three empty box.
 - No empty box.
- (b) Explain principle of multiplication with an example. (2 Marks)
- (c) Set A, B and C are: $A = \{1, 2, 3, 5, 8, 11, 12, 13\}$, $B = \{1, 2, 3, 4, 5, 6\}$ and $C = \{7, 8, 12, 13\}$. Find $A \cap B \cup C$, $A \cup B \cup C$, $A \cup B \cap C$ and $(B \sim C)$ (3 Marks)

- (d) Out of 30 students in college 15 takes art courses, 8 takes biology courses and 6 takes chemistry. It is also known that 3 students take all the three courses. Show that 7 or more students taken none of the course. (3 Marks)
7. (a) Explain principle of duality with example? (2 Marks)
- (b) What is power set? Write power set of set $A=\{1,2,3,4,5,6\}$. (3 Marks)
- (c) What is a function? Explain domain and range in context of function with example. (2 Marks)
- (d) State and prove the Pigeonhole principle. (3Marks)
8. (a) Find inverse of the following functions (2 Marks)
- i) $f(x) = \frac{x^2 + 2}{x - 3} \quad x \neq 3$
- (b) Explain circular permutation with the help of an example. (3 Marks)
- (c) What is indirect proof? Explain with an example. (2 Marks)
- (d) What is Boolean algebra? (3 Marks)

Course Code	:	MCS-015
Course Title	:	Communication Skills
Assignment Number	:	BCA(2)/015/Assignment/16-17
Maximum Marks	:	100
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session) 15th April, 2017 (For January 2017 Session)

This assignment has eight questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

1. Read the passage below and answer the questions that follow:

India's unique combination of IT skills, its labour advantages, capital flow and pool of ambitious, outward-looking companies is giving it a second, massive triple play advantage across sectors – in manufacturing, services and agriculture.

Only recently have we begun to recognize the broader implications of the IT revolution – that it is nothing less than a seismic shift in how the world economy works and that India may be especially well placed to take advantage of it. But then, economic power comes to countries in unexpected ways and at unexpected times, and it is usually enabled by new technologies. When Europe began invading eastern shores, the Asian empires were horrified – they had regarded them as little more than impoverished barbarians. Europe's growth in the sixteenth and seventeenth centuries was a result of technological advances in building large, multi-masted ships that could sail in the rough, open seas. The rise of new navigation tools – better maps, sextants and chronometers – also allowed explorers to chart out better sea routes, giving Europe access to colonies, slaves, silk and gold.

The tiny island of Britain emerged as a major European power in the eighteenth century with innovations in public finance and an embryonic stock market. These institutions created richly funded, powerful companies that quickly dominated global trade – our old acquaintance the East India Company was in fact the very first 'joint-stock' company of Britain. And of course, the technological prowess of the Industrial Revolution enabled Britain and Europe to dominate world economic growth for over a hundred years.

In this context, India has been fortunate even in its barriers. In the 1970s and 1980s, IT was literally the only option for a start-up entrepreneur to begin a business without political access or capital. A slow-growing economy also ended up diverting much of its huge talent into a small but burgeoning IT sector, and these firms got by on very little – a leased computer, a data line – over which they sold Indian brainpower to the outside world. India thus literally stumbled on to services growth, one that happens to be the emerging story for the international economy.

- (a) Why is India uniquely placed to succeed at the present moment? (2 Marks)
- (b) What does “triple play advantage across sectors” refer to? (2 Marks)
- (c) How and why do you think Britain and Europe succeeded in overcoming the Asian empires. (3 Marks)
- (d) Why was IT an easy option for a start up entrepreneur in India? Discuss. (2 Marks)
- (e) Give a suitable title to the passage. (1 Marks)
- (f) Pick out the words from the passage which mean the opposite of the following words given below: (5 Marks)

i	tiny	-	para 1
ii	disabled	-	para 2
iii	rich	-	para 3
iv	calm	-	para 2
v	unfortunate	-	para 4

- (g) Write sentences using the following words from the passage: (5 Marks)

i	unique	-	para 1
ii	unexpected	-	para 2
iii	horrified	-	para 2
iv	innovations	-	para 3
v	entrepreneur	-	para 4

2. Here is a phone conversation. Fill in the blanks with the appropriate sentences/phrases. (5 Marks)

Receptionist: Good Morning, Willow Sports,

Harsh: Hello, this is Harsh Wadhwa calling from Mumbai. Earlier this month I wrote to Mr. Tikku about some new sports equipment we have designed. He sent me an email suggesting I call to make an appointment to meet him in Bengaluru.
.....

Receptionist: Yes Mr. Wadhwa, I'll connect you to Ms. Rini Rebello, Mr. Tikku's secretary. She will help you with the appointment.

Harsh:

Rini: When would you like to come to Bengaluru?

Harsh:, but any time next week would be good for me.

Rini: Fine we keep it for 12th of June.

Harsh: Thank you. That's great.

3. Read the following letter and write a suitable reply to it. (10 Marks)

Dear Sirs,

We have received your consignment of Silky Blankets against our order no. AK/1/231, dated 16th March, 2016.

We regret to inform you that we have received only 900 blankets packed in nine cartons.

As we have to send off the bulk supply by the month end, kindly send us the remaining part of our order i.e. 300 blankets as soon as possible.

Yours sincerely

(.....)

4. Write an essay in 250 to 300 words on any one of the following: (20 Marks)

- Different ways in which the internet can help students learn.
- Are advances in science and technology making society happier?
- Students no longer need to go to libraries.

5. If you were evaluated in a group discussion what are the factors that you think the evaluator will assess you on. (5 Marks)

6. A junior colleague who wants to take the third leave within a week comes to the boss – **you**. Find out what his/her problem is and help him/her without compromising on the interest of your business/work. (10 Marks)

7. Write short notes on the following: (10 Marks)
- (a) Written versus oral communication
 - (b) An effective meeting
 - (c) Barriers to communication

8. Do as directed: (5 Marks)

- (a) Complete the sentences with words from the box. You don't need to use all the words.

although	because	but	so	until	when	while
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- ishe spoke very fast, I understood nearly everything.
- ii I couldn't read.....it was too dark.
- iii The food wasn't very good,he ate everything.

- iv The lesson finished early,we went for a walk.
- vI received his letter I went round to see him.

(b) Fill in the blanks with the correct forms of the verbs in brackets: (5 Marks)

- i I am sure we(meet) our targets if we
.....(maintain) our current level of sales.
- ii If I(be) in your position,
I.....(insist) on having more staff in the
department.
- iii(meet) an old business colleague of mine
while I was travelling to Delhi for a conference.

(c) Fill in the blanks with the correct preposition: (5 Marks)

- i The bus moved up the dirt track and **stirred**the dust.
- ii Ben **fell**.....his bicycle and broke his leg.
- iii The jeep raced round the corner at 80km an hour.
“**Hold**.....!” the driver cried.
- iv Mike wanted to leave the party at midnight. His friends
asked him to **stay**..... .
- v The dog could not get at the thief because it was **tied**
.....the gate.

(d) Fill in the blanks with the noun or verb form of the given word. (5 Marks)
Please make sure that the verb/noun is grammatically correct for
the context.

Examine - The history teacher told the class. “The final
.....will be in June. You will beon all the
topics you studied this semester.

Permit - The teacher gave Johnto leave the class
early. Students are normally notto leave
early but John had a good reason.

Explain - Charlie didn’t understand the teacher’s
about the laws of friction.

Course Code	:	BCSL-021
Course Title	:	C Language Programming
Assignment Number	:	BCA(2)/L-021/Assignment/16-17
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15 th October, 2016 (For July 2016 Session) 15 th April, 2017 (For January 2017 Session)

This assignment has eight questions. Answer all the question. Each question carries 5 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

1. Write a C program to generate Pascal's triangle. (5 Marks)
2. Write a C Program to find the surface area and the volume of a sphere. (5 Marks)
(Surface Area = $4 \pi r^2$ and Volume = $4/3 \pi r^3$)
3. Write a C program to find whether the given matrix is symmetric or not. (5 Marks)
4. Write a interactive C program to create records of 15 students, where each record has fields name, rollno, GPA and fees. Write a function *calcfee* () to reduce the fees of those students who have obtained GPA greater than 9.0 by 25% of the original fees, 10% fee concession if GPA is between 8.0 and 8.9 and 5% concession if the GPA is between 7.5 and 7.9. Display all the records before and after updation. (5 Marks)
5. Using pointers, write a function that receives a string and a character as argument. Delete all occurrences of this character in the string. The function should return corrected string with no holes/spaces. (5 Marks)
6. Define a structure that describes a hotel. It should have members that include the name, address, star(5 star, 3 star or 2 star), average room charge and number of rooms. Write a function to perform the following operations: (5 Marks)
(i) To print out hotels of a given grade in order of charges.
(ii) To print out hotels with room charges less than a given value.
7. Write an interactive C program which copies one file to another. (5 Marks)
8. Write an interactive C program to reverse the first n characters in a file. (5 Marks)
(Note: The file name and n are to be specified on the command line.)

Note: You must execute the program and submit the program logic, sample input and output along with the necessary documentation for these practical questions. Assumptions can be made wherever necessary.

Course Code	:	BCSL-022
Course Title	:	Assembly Language Programming Lab
Assignment Number	:	BCA(2)/L-022/Assignment/16-17
Maximum Marks	:	50
Weightage	:	25%
Last Dates for Submission	:	15th October, 2016 (For July 2016 Session) 15th April, 2017 (For January 2017 Session)

This assignment has two questions of total of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

1. Design a two bit counter circuit that counts from 1, that is, it will have state 01, 10, 11 only. The initial state of the counter may be assumed to be 01. The counter will be in following successive states: 01, 10, 11, 01, 10, 11, 01, 10, 11 ... Use any flip flop to design the circuit. You must design them using state transition diagram and Karnaugh's map. *(10 Marks)*

2. Write and run the following programs using 8086 assembly language.
 - (a) Write and run an Assembly language program that converts lowercase alphabets in a given input string to uppercase. The input may consist of uppercase alphabets, special characters and lowercase alphabets. For example, for the input string A@abAYaf, the output will be A@ABAYAF. You may assume that the string is available in the memory and output is stored in a memory array. *(10 Marks)*

 - (b) Write and run (using appropriate calling program) a near procedure in 8086 assembly language that converts 2 ASCII digits stored in two registers (say BH and BL) into an equivalent binary number. For example, if the BH and BL registers contain digits 4 and 5 respectively, then the binary number obtained will be 0010 1101 which is 45 in decimal. The parameters should be passed using registers and the result should be returned in AL register. *(12 Marks)*

 - (c) Write and run an 8086 assembly language program displays a string stored in memory. You must use appropriate interrupt for the same. *(8 Marks)*