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B. Tech
BCSE 3101

First Semester Examination – 2007

PROGRAMMING IN 'C'

Full Marks – 70

Time – 3 Hours

Answer Question No. 1 which is compulsory
and any **five** from the rest.

Figures in the right hand margin
indicate marks.

1. Answer the following questions : 2×10
- (a) What is the purpose of a header file ? Is the use of a header file absolutely necessary ?
 - (b) What are subscripts ? How are they written ? What restrictions apply to the values that can be assigned to subscripts ?

P.T.O.

- (c) How is the variables address determined?
- (d) What is the purpose of the key word void ? Where is this keyword used ?
- (e) Define a structure that contains the following three members :
an integer quantity called *won*
an integer quantity called *lost*
a floating point quantity called *percentage*
- (f) What is the purpose of *switch* statement ? Summarize the syntactic rules associated with the use of switch statement ?
- (g) What is a structure ? How does a structure differ from an array ?
- (h) How can a function return a pointer to its calling routine ?

- (i) What is the use of Streams in 'C programming ?
- (j) What do you mean by strong typing ?

2. (a) How is a structure member accessed ? How can a structure member be processed ? How can the size of a structure be determined ? In what units is the size reported ? 5

(b) Write a program which reads two integer values. If the first is less than the second, print the message up. If the second is less than the first, print the message down. If the numbers are equal, print the message equal. If there is an error reading the data, print a message containing the word Error and perform `exit(0)`. 5

3. (a) How are arrays usually processed in C ? Can entire arrays be processed with

single instructions, without repetition ?
How is an array name is interpreted when it is passed to a function ? 5

- (b) Write a program to count the vowels and letters in free text given as standard input. Read text a character at a time until you encounter end-of-data. Then print out the number of occurrences of each of the vowels **a, e, i, o** and **u** in the text, the total number of letters and each of the vowels as an integer percentage of the letter total.

Suggested output format is :

Numbers of characters :

a 3 ; e 2 ; i 0 ; o 1 ; u 0 ; rest 17

Percentages of total :

a 13% ; e 8% ; i 0% ; o 4% ; u 0% ;

rest 73%. 5

4. (a) Write a function "replace" which takes a pointer to a string as a parameter, which replaces all spaces in that string by minus signs and delivers the number of spaces it replaced. 5

- (b) Define a preprocessor macro swap (t, x, y) that will swap two arguments x and y of a given type t. 5

5. (a) What is meant by scope of a variable within a program ? What is the purpose of an automatic variable ? What is its scope ? 5

- (b) Read ordinary text a character at a time from the program's standard input and print it with each line reversed from left to right. Read until you encounter end-of-data. 5

6. (a) Write a program to print out the integers from 40 to 127 in decimal, octal, hexadecimal and also print out the equivalent character. 5

(b) Write a program that will prompt the user for two strings of characters, assemble them into a single string and then print the string out reversed. 5

7. (a) Write a program to read a positive integer at least equal to 3 and print out all possible permutations of three positive integers less or equal to than this value. 5

(b) Write a program to read two integers with the following significance. The first integer value represents a time of day on a

24-hour clock, so that 1245 represents quarter to one mid-day, for example : The second integer represents a time duration in a similar way, so that 345 represents three hours and 45 minutes. This duration is to be added to the first time and the result printed out in the same notation, in this case 1630 which is the time 3 hours and 45 minutes after 12.45. 5

8. (a) What are the six basic methods of converting values from one data type to another in C ? 2.5

(b) What is the use of escape sequences in C ? What are the different escape sequences in C ? 2.5

(c) What is the difference between the two additional memory allocation functions, Calloc() and Realloc() ? 2.5

(d) Describe the five arithmetic operators in C. Summarize the rules associated with their uses. 2.5

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