

For DAC / WiMC Course
Sample C questions for CET Stage – II

1. Write a recursive function that will generate and print first n fibonacci numbers
2. Define a structure called cricket that will describe the following information
Player name
Team name
Batting average
Using cricket, declare an array player with 10 elements and write a program to read the information about all the 10 players and print a team wise list containing names of players with their batting average.
3. Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string. The function should return the corrected string with no holes.
4. Given an array of sorted list of integer numbers, write a function to search for a particular item using the method of binary search. And also show how this function may be used in a program. Use pointers and pointer arithmetic.
5. Write a program to extract a portion of a character sting and print the extracted string. Assume that m characters are extracted, starting with n th character.
6. Write a program to print the Pascal triangle for 10 rows.
7. Write a program to determine and print the sum of the following harmonic series for a given value if n
 $1 + 1/2 + 1/3 + \dots + 1/n$
8. Write a program to encrypt a string and decrypt it using your own method of encryption and decryption.
9. Write a program, which will read a string and rewrite it in the alphabetical order.
10. Write a calendar program to find out the day of a given date in a particular year.
11. Write the function *replace*, which finds the string **from** in the string **string** and replaces it with the string **to**. Be sure to test it on replacement strings, which are larger, smaller, and the same size. Should it work if the replacement string is the empty string?
12. A magic square is a square array of positive integers such that the sum of each row, column, and diagonal is the same constant.

For Example:

is a magic square whose constant is 34.

Write a program to determine whether or not the given square is a magic square.

13. Write a function to get the transpose of a matrix.
14. Write a program to create an employee database using a linked list consisting of the following fields:
Name, Employee number, Designation, Basic pay, telephone number, Department

The following menu for operation of the database

Add employee data after a given name

Append data

Print the details of employees, department wise and total

Edit data of an employee

Find out the telephone number of an employee

15. Write a menu driven mini statistics package. A user should be able to enter up to 25 items of float data. The program should calculate the number of items in the data, the mean, the standard deviation, the variance, the median, and the mode of the data.
16. Write a function *reverse (str)* that reverses the character *string str*. Use it to write a program that reverses its input a line at a time.
17. Add commands to print the top element of the stack without popping, to duplicate it, and to swap the top two elements. Add a command to clear the stack.
18. Computers are playing an increasing role in education. Write a program that will help an elementary school student learn multiplication. Use *rand* function to produce two positive one-digit integers. It should then type a question such as: How much is 6 times 7? The student then types the answer. Your program checks the student's answer. If it is correct, print "Very Good!" and then ask another multiplication question. If the answer is wrong, print, "No, Please try again." And then let the student try the same question again repeatedly until the student finally gets it right.
19. Write a printf or scanf statement for each of the following:
 - a. Print unsigned integer 40000 left justified in a 15 – digit field with 8 digit.
 - b. Read a hexadecimal value into a variable hex.
 - c. Print 200 with and without a sign
 - d. Print 100 in hexadecimal form preceded by 0x
 - e. Read characters into array str until the letter p is encountered
 - f. Print 1.234 in a 9-digit field with preceding zeros.
 - g. Read a time of the form hh:mm:ss, storing the parts of the time in the integer variables hour, minute and second. Skip the colons (:) in the input stream, and display them. Use the assignment-suppression character.
 - h. Read a string of the form "characters" from the standard input. Store the string in character array str. Eliminate the quotation marks from the input stream and display it.
 - i. Read a time of the form hh:mm:ss, storing the parts of the time in the integer variables hour, minute and second. Skip the colons(:) in the input stream and display it. Do not use the assignment-suppression character.
20. Write a program that converts integer Fahrenheit temperatures from 0 to 212 degrees to floating-point Celsius temperatures with 3 digits of precision. Use the formula
$$\text{celsius} = 5.0 / 9.0 * (\text{fahrenheit} - 32)$$
to perform the calculation. The output should be printed in two right-justified columns of 10 characters each, and the Celsius temperatures should be preceded by a sign for both positive and negative values.

21. Left shifting an unsigned integer by 1 bit is equivalent to multiplying the value 2. Write function power2 that takes two integer arguments number and pow and calculates
 $\text{number} * 2^{\text{pow}}$
 Use the shift operator to calculate the result. Print the values as integers and as bits.
22. Write statements that accomplish each of the following. Assume that the structure

```
struct person {
    char lastName[15];
    char firstName[15];
    char age[4];
};
```

 has been defined and that the file is already open for writing.
- Initialize the file "nameage.dat" so that there are 100 records with lastName = "unassigned" firstName= "" and age = "0".
 - Input 10 last names, first names and ages, and write then to the file.
 - Update a record: if there is no information in the record, tell the user "No info"
 - Delete a record that has information by reinitializing that particular record.
23. You are the owner of a hardware store and need to keep an inventory that can tell you what tolls you have, how many you have and the cost of each one. Write a program that initializes the file "hardware.dat" to 100 empty records, lets you input the data concerning each tool, enables you to list all your tools, lets you delete a record for a tool that you no longer have and lets you update any information in the file. The tool identification number should be the record number. Use the following information
- | Record # | Tool Name | Quantity | Cost |
|----------|-----------------|----------|-------|
| 3 | Electric sander | 7 | 57.98 |
| 17 | Hammer | 76 | 11.99 |
| 24 | Jig saw | 21 | 11.00 |
| 39 | Lawn mower | 3 | 79.50 |
| 56 | Power saw | 18 | 99.99 |
| 65 | Screwdriver | 106 | 6.99 |
| 77 | Sledge hammer | 11 | 21.50 |
| 83 | Wrench | 34 | 7.50 |
24. Read a five-letter word into the computer, then encode the word on a letter-by-letter basis by subtracting 30 from the numerical value that is used to represent each letter. Thus if the ASCII character set is being used, the letter a (which is represented by the value 97) would become a C (represented by the value 67), etc. Write out the encoded version of the word. Test the program with the following words: white, roses, Japan, zebra.
25. Calculate the weighted average of a list of n numbers using the formula

$$x_{\text{avg}} = f_1x_1 + f_2x_2 + \dots + f_nx_n$$
 where the f's are fractional weighting factors, i.e.,
 $0 \leq f_i < 1$, and $f_1 + f_2 + \dots + f_n = 1$
 Test your program with the following data:

i = 1	f = 0.06	x = 27.5
2	0.08	13.4
3	0.08	53.8
4	0.10	29.2
5	0.10	74.5
6	0.10	87.0
7	0.12	39.9
8	0.12	47.7
9	0.12	8.1
10	0.12	63.2

Write a complete C program for above the problem. Use whatever control structures are most appropriate for each problem. Begin with a detailed outline. Rewrite the outline in pseudo code if the translation into a working C program is not obvious. Be sure to use good programming style (comments, indentation, etc.)

26. Write a function that will calculate and display the real roots of the quadratic equation

$$ax^2 + bx + c = 0$$

using the well know quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

use the function in the program.

27. Write a program to print the values of the predefined symbolic constants listed below

Symbolic constant	Explanation
<code>_LINE_</code>	The line number of the current source code line (an integer constant)
<code>_FILE_</code>	The presumed name of the source file (a string)
<code>_DATE_</code>	The date the source file is compiled (a string of the form "Mmm dd yyy" such as Jan 19 2002)
<code>_TIME_</code>	The time the source file is compiled (a string literal of the form "hh:mm:ss")

28. Write a preprocessor directive to accomplish each of the following:

- Define symbolic constant YES to have the value 1.
- Define symbolic constant NO to have the value 0.
- Include the header file common.h. The header is found in the same directory as the file being compiled.
- Renumber the remaining line in the file beginning with line number 3000.
- If symbolic constant TRUE is defined, undefined it and redefine it as 1. Do not use `#ifdef` preprocessor directive.
- If symbolic constant TRUE is defined, undefined it and redefine it as 1. Use `#ifdef` preprocessor directive.
- If symbolic constant TRUE is not equal to 0, define symbolic constant FALSE as 0. Otherwise define FALSE as 1.
- Define macro SQUARE_VOLUME that computes the volume of a square. The macro takes one argument.

30. A user requires to do the following operations:

1. Number the lines in a file
2. Display **n** lines from a given line number.
3. Delete a particular line
4. Search for a given word and print all the lines where the word is found

31. Write a complete C program that will generate a table of compound interest factors, F/P , where $F/P = (1 + i/100)^n$

In this formula F represents the future value of a given sum of money, P represents its present value, i represents the annual interest rate, expressed as a percentage, and n represents the number of years.

Let each row in the table correspond to different value of n , with n ranging from 1 to 30 (hence 30 rows). Let each column represent a different interest rate. Include the following interest rates: 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 11, 12, and 15 percent (hence the total of 16 columns). Be sure to label the rows and columns appropriately.