

CSE2031

Winter 2016 Practice Questions

Here are some practice questions to test your C abilities

1. Write a program that reads a person name on the form first name followed by either middle name and last name, or just last name. Then the program should display the name as last name followed by comma, then first letter of the first name followed by a period. For example

Input	Output
John Smith	Smith, J.
John D. Smith	Smith, J. D.
John David Smith	Smith, J. D.

The words in the input should be separated by any number of white spaces.

2. Write a program that calculates the average word length in a sentence. The input is a stream of words with no punctuations except the period at the end of the sentence. The program then displays the average word length. If the first character is a period, the program should display an appropriate message. The program should also ignore every thing after the first period.
3. Write a program that accepts an integer from the standard input and display the positions of the digits that are repeated.
For example if the input is 56257278 the output should be 0,2,3,4,5,6
Explanation: 56257278
positions 01234567
repeated rnrrrrrn
where r means repeated, n means not repeated. Note that the first digit (5) is at position 0.
4. Write a program that reads a text file on the form
Student first name, last name, email addresses, three test scores.
Student names (first and last) are a maximum of 20 characters. Email address is a maximum of 20 characters. Then test scores are out of a 100. Each record (line) is read and stored in a struct with the above fields. Fields are separated by white spaces.
For simplicity, you should allocate (realloc) memory each time you read 5 records.
Then your program should read inquires from the user, the query is on the form
command data

The allowed commands are

```
Tn lastname
```

Where n is either 1,2, or 3 followed by student last name

Your program should display

first name, last name of the student followed by result of test n

```
Av lastname
```

Your program should display firstname lastname and the average of the 3 scores with 2 decimal places

```
CAV Tn
```

where n is 1, 2, or 3. Your program should display the class average for test n.

```
CAV
```

Your program should display class average for all the three tests

```
average_test_1 average_test_2 average_test_3
```

5. Write a program that reads a 2-d matrix and displays it in a diagonal by diagonal format, for example, if the matrix is

```
1  2  3  4  5  6
7  8  9 10 11 12
13 14 15 16 17 18
```

Then displays it as

```
1 8 15 2 9 16 3 10 17 4 11 18 5 12 13 6 7 14
```

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6. Write a program that display an isosceles triangle that made of '*'. The program reads an integer from the standard input. Then it display on the standard output a triangle with the base equal to n '*'s. The row above that have $n-2$ '*'s and so on until the first row contains either 1 or 2 '*'s (depending on n being odd or even). The figure below shows the triangle with $n = 7$.

```
  *
 ***
*****
*****
```

7. Write a program that displays a rectangle on the screen. The program reads from the standard input three parameters, width, height, and a character. Then it display a rectangle with width and height using the character read. For example, if the input 7 5 x. The output should be

```

XXXXXXXX
X      X
X      X
X      X
XXXXXXXX

```

8. Write a program that encodes a message. The message is read from the standard input. The key is an integer (k). The program arranges the message in a r -by- K rectangle. Then the program displays the message column by column. For example if the key is 11, the message is

If you are looking for ransom, I can tell you I don't have money. But what I do have are a very particular set of skills, skills I have acquired over a very long career. Skills that make me a nightmare for people like you\n

The program arranges it in a x -by-~~11~~ (22) matrix (the number of columns is ~~11~~ 22)

```

If you are looking for
ransom, I can tell yo
u I don't have money.
But what I do have are
a very particular set
of skills, skills I h
ave acquired over a ve
ry long career. Skills
that make me a nightm
are for people like yo
u\n

```

Then, the output is displayed column by column

```

I uB ar aufr uaovytr
aIt fe and so on

```

Can you think of a decoder program for the previous encoder?

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Question 1

Read an integer and displays how many *different digits* in that integer.

For example if the input is

Input output

43665 4365 the second 6 is removed
12132152 1235 the repeated 1's, and 2's are removed

Note that the order of the displayed digits is the same as the order in the original integer.

Question 2

Read a string from the standard input and display the character with the most repetition. If there are more than one character with the same repetition, display all of them.

Question 3

Write a function to read a string from the standard input and calculate the length of the string. Consider two cases, if the string ends with a white space, and if the string ends with a new line. **Do not use strlen.**

Question 4

Write a program to read a string terminated by a new line character and display the string after removing all white spaces (space(s) and tab(s))

Question 5

Write a program that accept the following file from the standard input. The file contains the voting results of an election by precinct.
Results of a fictional election.

Candidate	A	B	C	D
Precinct				
1	312	520	425	612
2	470	312	456	123
3	753	159	852	456
4	147	258	369	759
5	951	856	751	125

The actual file used for testing is in the same format. The number of precincts may vary, and of course the number of votes may vary.
Your program should display the winner of the election, and the percentage of the votes he/she got.

Question 6

Consider the following table for roman numerals.

Decimal value	Roman numeral
1	I

4	IV
5	V
9	IX
10	X
40	XL
50	L
90	XC
100	C
400	CD
500	D
900	CM
1000	M

Write a program to read a roman numeral as a string and display the value (in decimal).

The processing is done left to right, for example the string MCMXCVI

M CM XC V I

1000+ 900 + 90 + 5 +1 = 1996

Keep in mind that C =100, but CM=900, so when you see C you don't know what is the value until you see the next char.