

Information units

1 bit – elementary unit

1B (Byte) = 8 bits

1KB (KiloByte) = 2^{10} B (1024 B)1MB (MegaByte) = 2^{10} KB (1024 KB)1GB (GigaByte) = 2^{10} MB (1024 MB)1TB (TeraByte) = 2^{10} GB (1024 GB)**Table of powers of number 2**

$2^0 = 1$

$2^1 = 2$

$2^2 = 4$

$2^3 = 8$

$2^4 = 16$

$2^5 = 32$

$2^6 = 64$

$2^7 = 128$

$2^8 = 256$

$2^9 = 512$

$2^{10} = 1024$

$2^{11} = 2048$

$2^{12} = 4096$

$2^{13} = 8192$

$2^{14} = 16384$

$2^{15} = 32768$

$2^{16} = 65536$

HTML codes for Romanian letters:

Letter	Ă	ă	Â	â	Î	î	Ș	ș	Ț	ț
Cod	Ă	ă	Â	â	Î	î	Ş	ş	Ţ	ţ

Nr	Item	Score										
1.	<p>A graphic editor allows the application of 92 artistic effects over the images. The multitude of these effects forms the set of possible messages of a source of information. Each effect produced by the editor is encoded by binary words of equal length.</p> <p>a) Calculate and write in the space reserved for the answer the smallest length of binary words of equal length, sufficient for the unique encoding and decoding of the messages of the given source. Write the formulas used and the calculations: Answer _____ bit</p> <p>b) A color image has the size of 128x256 pixels and 256 luminance levels for the 3 basic colors. Calculate and write in the space reserved for the answer the amount of information (in KB) of this image. Write the formulas used and the calculations: Answer: _____ KB</p>	L 0 1 2 3 4 5	L 0 1 2 3 4 5									
2.	<p>a) For each of the following statements check the correct option:</p> <ul style="list-style-type: none"> The octal numbering system is: <ul style="list-style-type: none"> <input type="checkbox"/> Positional <input type="checkbox"/> Non-positional The smallest base in which the number 136,5 is correctly represented is: <ul style="list-style-type: none"> <input type="checkbox"/> 7 <input type="checkbox"/> 8 <p>b) Transform into the octal numbering system and write in the space reserved for the answer the number $(19,5)_{10}$. Write the calculations: Answer: (_____)₈</p>	L 0 1 2 3 4 5	L 0 1 2 3 4 5									
3.	<p>a) Link with lines the URL address types with the correct examples of address:</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 40%;">Numeric address</td> <td style="width: 10%;">•</td> <td style="width: 50%;">• <code>liceu@mail.md</code></td> </tr> <tr> <td>Symbolic address</td> <td>•</td> <td>• <code>liceu.md</code></td> </tr> <tr> <td></td> <td></td> <td>• <code>146.51.9.247</code></td> </tr> </table> <p>b) Check the correct name of the computer that requires access to certain resources: <input type="checkbox"/> Client <input type="checkbox"/> Server</p>	Numeric address	•	• <code>liceu@mail.md</code>	Symbolic address	•	• <code>liceu.md</code>			• <code>146.51.9.247</code>	L 0 1 2 3	L 0 1 2 3
Numeric address	•	• <code>liceu@mail.md</code>										
Symbolic address	•	• <code>liceu.md</code>										
		• <code>146.51.9.247</code>										

4.	<p>Write a function which receives from the main program, as a parameter, a string and returns the number of occurrences in the given string of the character '2'. The length of the string will not exceed 200 symbols. There should be at least one '2' character in the processed string.</p> <p>Example. For the string 'a225NM2E47OP2' sent as the current parameter will be returned the value 4.</p>	L 0 1 2 3 4 5	L 0 1 2 3 4 5	
5.	<p>The following Pascal program is given:</p> <pre> program P5; type Tera=array[1..4] of integer; var a:Tera; i:integer; function F1(x:integer):integer; begin if x div 3=0 then F1:=3 else F1:=sqr(x); end; begin for i:=1 to 4 do if i mod 2 <>0 then a[i]:=F1(i) else a[i]:= i+5; for i:= 1 to 4 do write(a[i], ' '); end. </pre>	<p>Perform the following tasks for the program P5:</p> <p>a) Write the name of the formal parameter of the function F1 of the program P5: _____</p> <p>b) Underline in the text of the program the call of subprogram F1.</p> <p>c) Write the type of the result of the F1 function of the program P5: _____</p> <p>d) Write what will be displayed as a result of the running the program P5: _____</p> <p>e) Write the name of the standard function used in the program P5: _____</p> <p>f) Determine the truth value for the statement "In the program P5 are used <i>structured data types</i>". Check the correct option: <input type="checkbox"/> True <input type="checkbox"/> False</p>	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

6 The list of phone numbers dialed during a day from a mobile phone is stored in the **APEL.TXT** file in the order of the calls made.

Task: Write a program that determines the last phone number called on the current day and how many times this number was called.

Input: The text file **APEL.TXT** contains, in the first line, an integer number N ($0 < N \leq 20$) – the number of calls made during the day. Each of the following N lines contains an integer - the phone number called for a separate call.

Output: Two integers will be displayed on the screen separated by space: the last phone number called on the current day and the number of calls made to this phone number during the day.

L
0
1
2
3
4
5
6
7

L
0
1
2
3
4
5
6
7

Example:

APEL.TXT:	Ecran:
5 22214 22235 22346 22605 22346	22346 2
The solution will be appreciated for: data types and variable declarations; operations with the text file; reading and writing data; algorithm organization.	

7 A database was created in MS Access. The current content of the database tables are presented in *Image 1*:

ID carte	Genul cartii	Titlul	Autorul	Numar	Editura
1	Ficțiune istorică	Hoțul de cărți	Markus Zusak	571	Editura RAO
10	Ficțiune, Autobiografie	Trenul fantomă către r	Paul Theroux	570	Editura Polirom
11	Ficțiune romantică	Șoapte de iubire	Jamie McGuire , Teresa M	335	Editura Trei
12	Roman	Eu încă te iubesc	Cristina Chiperi	314	Editura Bestseller
13	Ficțiune	A ta veșnic Lara Jean	Jenny Han	379	Editura Trei
14	Roman	Să ucizi o pasăre cântăc	Harper Lee	368	Editura Polirom
15	Roman	De 19 ori Katherine	John Green	282	Editura Trei
16	Roman	Trei metri deasupra ce	Federico Moccia	373	Editura Bestseller
17	Povestire , Ficțiune	După cutremur	Haruki Murakami	194	Editura Polirom
18	Roman de aventură	Insula comorii	Robert Louis Stevenson	250	Editura Adevărul
19	Roman de dragoste	Și dacă e adevărat...	Mark Levy	229	Editura Trei
2	Ficțiune fantastică	Jumătatea rea	Sally Green	382	Editura Trei
20	Ficțiune	Insomnii	Irina Binder	342	Editura For YOU

ID abonat	Nume	Prenume	Data nasterii	Telefon	Email	Domiciliu	ID carte
a001	Batu	Ana	04.04.2002	078933564	bacu.anamaria@gmail.com	st.Alecu Ruso	5
a002	Ciubanschi	Evelina	23.04.2003	062436882	ciubanchi.eva@gmail.com	st.Alexandru Boldu	22
a003	Lavric	Loredana	20.03.2003	061256348	lavric.loredana@gmail.com	st.Bariera Orhei	3
a004	Luca	Elena	19.10.2002	069834652	lica.elena@gmail.com	st.Bogdan Voievod	21
a005	Mărgine	Ana	25.06.2002	073655098	margine.ana@gmail.com	St. Calatorilor	25
a006	Negruta	Valeria	26.10.2002	068634748	negruta.valeria@gmail.com	st. Capriana	9
a007	Pavaloi	Daniil	18.05.2002	068223654	pavaloi.daniil@gmail.com	st. Dante	21
a008	Popescu	Mădălina	10.01.2003	072300063	popescu.madalina@gmail.com	st. Doina	17
a009	Răilean	Vera	17.05.2002	063451668	railean.vera@gmail.com	st.Fauresti	20
a010	Rusu	Andrei	30.10.2002	068966537	rusu.andrei@gmail.com	st. Fantanilor	20

Image 1

Perform the following tasks, using the contents of the database tables:

- a) Fill in *Image 2* all the necessary elements, including the relations between the tables, to define a selection query in *Design View*. The query will display 5 fields:
- Surname (**Nume** field), first name (**Prenume** field), author (**Autorul** field), title (**Titlul** field), number of pages (**Numar** field).
 - Select the subscribers whose names begin with the letter R (**Nume** field), that have borrowed the books whose title contains the letter i (**Titlul** field), with the number of pages greater than 200 (**Numar** field).
 - The data will be sorted in ascending order by using the values in the **Nume** field.

Field:					
Table:					
Sort:					
Show:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:					
or:					

Image 2

L
0
1
2
3
4
5
6
7
8
9
10

L
0
1
2
3
4
5
6
7
8
9
10

Fill in *Image 3* with the properties of the **Genul cartii** field of the **Carti** table so that:

- The field should contain no more than 50 characters.
- The field should be of mandatory completion type.
- The text that will be displayed in the field header in the queries, forms and reports will be **Genul**

General	Lookup
Field Size	
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	
Allow Zero Length	
Indexed	
Unicode Compression	

Image 3

8 Write a fragment of HTML code which will display in the browser window the information similar to the one in the *Image 4*.

Note:

- The table's title is an active area of a reference to the site <https://mecc.gov.md/>.
- The HTML code contains an unordered list.
- The HTML code and the image are stored in the same folder. The image name is **hartă.png**.

[MECC.GOV.MD](https://mecc.gov.md/)

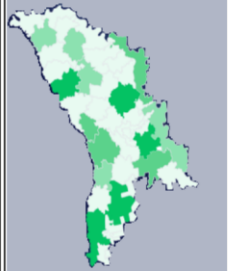
Educație de calitate în mediul rural	
	<ul style="list-style-type: none"> ▪ Granturi de echitate - 1190 școli ▪ Granturi de calitate - 340 licee

Image 4

L	L
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10