

NAME					SURNAME				
Student-ID	S							A/1	
<input type="checkbox"/> AAA-LYU/English <input type="checkbox"/> MA -ZZZ/English <input type="checkbox"/> Other:									

QUESTION 1	<i>Result</i>
Given the integer numbers n1 and n2, expressed in decimal, represent them as pure binary, and specify how many bytes are required for do so: n1= 392 n2= 1056	n1 ₍₂₎ = bytes for n1 = n2 ₍₂₎ = bytes for n2 =
Steps	

QUESTION 2
State whether the following Boolean expressions are equivalent or not, justifying your answer: 1) $((A \cdot B') \cdot (A+B')) + (B \cdot C')$ 2) $(A \cdot B') + (B \cdot C')$
Answer

QUESTION 3
Explain the main goal of the compilation process of a program, before the linking step. In particular, state which kind of files the compiler takes as input, and which ones it produces as output.
Answer

QUESTION 4 (PROGRAMMING)

Write a C program able to identify the word that appears the most quantity of times in a text file. In detail, the following assumptions must be followed:

- The file name is specified as the first argument on the command line
- The number of characters and words in the file is not known
- The file contains uppercase letters, spaces, and new-line characters, only
- The text file is composed of more than one line
- The maximum number of distinct words is 5000
- Each word counts with at most 20 characters
- The words are separated by one or more spaces
- In the case that more than one word in the file appears the maximum number of times, the text file prints the first one
- It is also request to print how many times the word appears in the text file.

For example, if the file **fiaba.txt** contains the following text:

IL LUPO PENSA QUANTO QUELLA BAMBINETTA BELLA E MORBIDINA SIA
PROPRIO UN BOCCONCINO PRELIBATO

SAREBBE CERTO STATA ANCORA MEGLIO DELLA VECCHIA

DECIDE DI MANGIARE SIA LA BAMBINETTA CHE LA VECCHIA

C:\> **exam fiaba.txt**

**The word which is contained more times in the file fiaba.txt is:
BAMBINETTA (2 times)**

NAME					SURNAME				
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QUESTION 1	<i>Result</i>
Given the integer numbers n1 and n2, expressed in decimal, represent them as pure binary, and specify how many bytes are required for do so: n1= 622 n2= 250	n1 ₍₂₎ = bytes for n1 = n2 ₍₂₎ = bytes for n2 =
Steps	

QUESTION 2
State whether the following Boolean expressions are equivalent or not, justifying your answer: 1) $((A \cdot B)' + (A' \cdot C)) + ((A' \cdot C)' + C)$ 2) $0 + B' + C'$
Answer

QUESTION 3
Explain the main goal of the linking process of a program. In particular, state which kind of files the linker takes as input, and which ones it produces as output.
Answer

QUESTION 4 (PROGRAMMING)

Given two text files that contain sequences of integer numbers, write a C program able to determine whether the sequence of numbers stored in the first file is contained on the second file, and in the case, the program must determine if it appears more than one time, indicating how many times this appears (the same consecutive series of numbers, hence in the same order). The program must print on the screen the row value where the first sequence starts on the second file (assume that the first row is the row 0).

In detail, the following assumptions must be followed:

- The names of the first and the second file are specified in this order as arguments on the command line
- The sequence contained in the first file is always shorter than the one in the second file
- The files contain at most 1000 values
- The values are written one for each row.

For example, if the file **seq1.txt** contains:

23
10
23

and the file **seq2.txt** contains:

18
23
10
23
10
23
99

```
C:\> exam seq1.txt seq2.txt
```

```
Match 1 starting from row 1
```

```
Match 2 starting from row 3
```

```
The sequence 1 is contained 2 times
```

NAME						SURNAME			
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QUESTION 1	<i>Result</i>
Given the integer numbers n1 and n2, expressed in decimal, represent them as pure binary, and specify how many bytes are required for do so: n1= 342 n2= 450	n1 ₍₂₎ = bytes for n1 = n2 ₍₂₎ = bytes for n2 =
Steps	

DOMANDA 2	
State whether the following Boolean expressions are equivalent or not, justifying your answer: 1) $((A \cdot B)' + (A' \cdot C)) + ((A' \cdot C)' + C)$ 2) $1 + B' + C'$	
Answer	

QUESTION 3	
Explain the main differences between source and executable files.	
Answer	

QUESTION 4 (PROGRAMMING)

Given two text files that contain sequences of integer numbers, write a C program able to determine if the numbers stored in the second file appear at least one time in the first one. In addition, print the number of times every number appears in the first file.

In detail, the following assumptions must be followed:

- The names of the first and the second file are specified in this order as arguments on the command line
- In the two files, the values are written one for each row
- All the values are between 0 and 100
- The quantity of numbers in the second file is unknown, and there are no duplicated values
- The first file contains at most 500 values

For example, in the file **seq1.txt** contains:

```
23
10
52
23
10
```

and the file **seq2.txt** contains:

```
52
23
10
```

```
C:\> exam seq1.txt seq2.txt
```

All the numbers of the second file appear at least once in the first file.

Occurrences:

```
10: 2
23: 2
52: 1
```