Καθηγητής Πληροφορικής
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ANSWERS
CHAPTER 1

VCZ

EXERCISE 1

1.	information	**8.**	compiler	**15.**	portability
2.	analysis	**9.**	clear	**16.**	alphabet
3.	structured	**10.**	computer	**17.**	syntax
4.	optimization	**11.**	program	**18.**	rules
5.	algorithm	**12.**	languages	**19.**	run-time
6.	syntactic	**13.**	machine language	**20.**	assembly
7.	command	**14.**	assembler		

EXERCISE 2

A) Notice the election to the students
Record the list of candidates
Create the ballot form and photocopy it
Define the Election Committee
Set the date of elections
Conduct the electoral procedure
Tabulate the votes of candidates
Calculate the total votes for each candidate
Demonstrate the final results on the board
Record the final results in the official book of the school

B) The analysis of this particular problem helps us to resolve it more easily and more efficiently since it allows us to focus on each individual sub-problem and simplify the whole process.

C) The execution environment of this problem is our school.

D) Criterion A (solving ability): solvable
Criterion B (structuring level): structured
Criterion C (solving type): computational

EXERCISE 3

Table 1: 1 – E, 2 – B, 3 – D, 4 – F, 5 – C, 6 – A

Table 2: 1 – E, H, 2 – B, 3 – A, 4 – C, G, 5 – F, 6 - D

EXERCISE 4

A) It is a clear and intelligible algorithm
B) It ends in a finite number of steps
C) It gives back a false answer because it makes an addition instead of a subtraction
D) There is a run-time error caused by an incorrect algorithm

EXERCISE 5

UNSOLVED	OPEN	OPTIMIZATION
▪ the prevention of aging ▪ the prevention of death ▪ the squaring of a circle ▪ achieving a speed greater than the light ▪ teleportation to the past	▪ achieving the accurate forecasting of earthquakes ▪ checking the possible existence of life in other planet ▪ establishing of manned space missions for discoveries outside our galaxy	▪ maximizing the profits of an enterprise ▪ minimizing the expenditures of a household ▪ the fastest distribution of the letters and packets of a postman ▪ finding the students with the greatest height in the class

EXERCISE 6

Each programming language is designed to implement different types of algorithms and applications as well as to resolve particular types of problems.
For example, an algorithm that can be fast implemented in a specific programming language may be more complicated or impossible to be implemented in some other language.
The number of problems and applications is so large that the potential of all programming languages to become one seems to very distant.

EXERCISE 7

Algorithmic solution with 15 steps

1) 1st disc to the medium pile
2) 2nd disc to the right pile
3) 1st disc to the right pile
4) 3rd disc to the medium pile
5) 1st disc to the left pile
6) 2nd disc to the medium pile
7) 1st disc to the medium pile
8) 4th disc to the right pile
9) 1st disc to the right pile
10) 2nd disc to the left pile
11) 1st disc to the left pile
12) 3rd disc to the right pile
13) 1st disc to the medium pile
14) 2nd disc to the right pile
15) 1st disc to the right pile

EXERCISE 8

Algorithmic solution with 8 steps

1)	Fill the small container	(big 0L - small 3L)
2)	Transfer 3L to the big container	(big 3L - small 0L)
3)	Fill the small container	(big 3L - small 3L)
4)	Transfer 2L to the big container	(big 5L - small 1L)
5)	Empty the big container	(big 0L - small 1L)
6)	Transfer 1L to the big container	(big 1L - small 0L)
7)	Fill the small container	(big 1L - small 3L)
8)	Transfer 3L to the big container	(**big 4L** - small 0L)

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EXERCISE 9

Algorithmic solution with 11 steps

Step	Command	1st shore	2st shore
1	Transfer 2 cannibals to the 2nd shore	1 can, 3 mis	2 can, 0 mis
2	Leave 1 cannibal to the 2nd shore and move back 1 cannibal	2 can, 3 mis	1 can, 0 mis
3	Transfer 2 cannibals to the 2nd shore	0 can, 3 mis	3 can, 0 mis
4	Leave 1 cannibal to the 2nd shore and move back 1 cannibal	1 can, 3 mis	2 can, 0 mis
5	Transfer 2 missionaries to the 2nd shore	1 can, 1 mis	2 can, 2 mis
6	Leave 1 missionary to the 2nd shore and move back 1 cannibal and 1 missionary	2 can, 2 mis	1 can, 1 mis
7	Transfer 2 missionaries to the 2nd shore	2 can, 0 mis	1 can, 3 mis
8	Leave 2 missionaries to the 2nd shore and move back 1 cannibal	3 can, 0 mis	0 can, 3 mis
9	Transfer 2 cannibals to the 2nd shore	1 can, 0 mis	2 can, 3 mis
10	Leave 1 cannibal to the 2nd shore and move back 1 cannibal	2 can, 0 mis	1 can, 3 mis
11	Transfer 2 cannibals to the 2nd shore	0 can, 0 mis	3 can, 3 mis

EXERCISE 10

Algorithmic solution with 16 steps

1)	Fill the small jar	(big 0L - small 4L)
2)	Transfer 4L to the big jar	(big 4L - small 0L)
3)	Fill the small jar	(big 4L - small 4L)
4)	Transfer 4L to the big jar	(big 8L - small 0L)
5)	Fill the small jar	(big 8L – small 4L)
6)	Transfer 1L to the big jar	(big 9L – small 3L)
7)	Empty the big jar	(big 0L – small 3L)
8)	Transfer 3L to the big jar	(big 3L – small 0L)
9)	Fill the small jar	(big 3L - small 4L)
10)	Transfer 4L to the big jar	(big 7L - small 0L)
11)	Fill the small jar	(big 7L - small 4L)
12)	Transfer 2L to the big jar	(big 9L - small 2L)
13)	Empty the big jar	(big 0L – small 2L)
14)	Transfer 2L to the big jar	(big 2L – small 0L)
15)	Fill the small jar	(big 2L – small 4L)
16)	Transfer 4L to the big jar	(**big 6L** – small 0L)

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