

**The State of Israel
Ministry of Education**

Exam Type:

א. *Bagrut* for high schools

ב. *Bagrut* for external examinees

Exam Date: Summer 2016

Exam Number: 899122, 601

English Translation (3)

מדינת ישראל

משרד החינוך

סוג הבחינה:

א. בגרות לבתי ספר על-יסודיים

ב. בגרות לנבחנים חיצוניים

מועד הבחינה: קיץ תשע"ו, 2016

מספר השאלון: 899122, 601

תרגום לאנגלית (3)

**Introduction to Computer
Science**

1 point

Instructions for examinees

א. Duration of exam: Two hours

ב. Exam structure and breakdown of points:

This exam has two sections.

Section One - This section consists of five questions and you must answer all of them.

$(5 \times 10) = 50$ points

Section Two - This section includes questions in two different tracks.

Answer questions only for the track in which you studied, according to the instructions for that track.

$(1 \times 10) + (2 \times 20) = 50$ points

Total – 100 points

ג. Material that may be used during the exam:

All material, except for a programmable computer.

ד. Special instructions:

(1) Use only one programming language for all of the programs you are asked to write.

(2) On the outer cover of the answer booklet, write which **programming language** you are using: Pascal or BASIC, and in which **track** you studied: Basics of Programming [ב] or Software Tools and their Applications [א].

יסודות המחשב

יחידת לימוד אחת

הוראות לנבחן

א. משך הבחינה: שעותיים.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שני פרקים.

פרק ראשון – בפרק זה חמש שאלות, ועליך לענות על כולן.

$(10 \times 5) = 50$ נקודות

פרק שני – בפרק זה שאלות בשני מסלולים שונים. עליך לענות רק על שאלות במסלול

שלמדת, על פי ההוראות באותו מסלול.

$(10 \times 1) + (20 \times 2) = 50$ נקודות

סה"כ – 100 נקודות

ג. חומר עזר מותר בשימוש:

כל חומר עזר (חוץ ממחשב הניתן לתכנות).

ד. הוראות מיוחדות:

(1) עליך לכתוב בשפה אחת בלבד את כל

התכניות שאתה נדרש לכתוב.

(2) רשום על הכריכה החיצונית של המחברת –

באיזו שפה אתה כותב: פסקל או בייסיק,

ובאיזו מסלול למדת;

יסודות התכנות ב' או כלי תוכנה ויישומיהם.

כתוב במחברת הבחינה בלבד, בעמודים נפרדים, כל מה שברצונך לכתוב כטיוטה (ראשי פרקים, חישובים וכדומה). רשום "טיוטה" בראש כל עמוד טיוטה. רישום טיוטות כלשהן על דפים שמחוץ למחברת הבחינה עלול לגרום לפסילת הבחינה!

Write only in the answer booklet. Use separate pages for everything you want to use as draft material (outlines, calculations, etc.). Write "טיוטה" at the top of each draft page. Writing draft material on pages outside the answer booklet may lead to the disqualification of your exam!

Good Luck!

בהצלחה!

Questions

Note: Use only one programming language for all of the programs you are asked to write. **On the outer cover** of the answer booklet, write which **programming language** you are using: Pascal or BASIC, and in which **track** [מסלול] you studied: Basics of Programming ב [יסודות התכנות ב'] or Software Tools and their Applications [כלי תוכנה ויישומיהם].

Section One (50 points)

Answer all the questions **1-5** (each question – 10 points).

1. A program segment is shown below written in Pascal and BASIC.
Using a trace table [טבלת מעקב], follow the execution of the program segment and write what will be printed.

For the input, choose a number between 10 and 20.

<u>Pascal</u>	<u>BASIC</u>
C := 30;	C = 30
READLN (A);	INPUT A
B := A – C;	B = A – C
Writeln (A , B , C);	PRINT A , B , C
B := ABS (B);	B = ABS (B)
Writeln (A , B , C);	PRINT A , B , C

2. A program segment is shown below written in Pascal and BASIC.
Using a trace table, follow the execution of the program segment and write what will be printed.

For the input, use a number of your choosing.

<u>Pascal</u>	<u>BASIC</u>
X := 2;	X = 2
READLN (Y);	INPUT Y
X := X + Y;	X = X + Y
A := ' MARK ';	A\$ = "MARK"
B := 'GO';	B\$ = "GO"
Writeln (A , B , '=' , X);	PRINT A\$, B\$, "=", X

3. An algorithm [אלגוריתם מילולי] is presented below.

Translate the algorithm into a program segment in Pascal or BASIC.

Enter a number for the variable NUM

Assign the number 6 to the variable NICKY

Assign the product [המכפלה] of NUM and NICKY to the variable X

Print the value of the variable X

4. An algorithm is presented below.

Translate the algorithm into a program segment in Pascal or BASIC.

Input a number for the variable X

Input a number for the variable Y

Assign the sum of Y and X to the variable K

Decrease the value of the variable K by 7

Print the values of the variables X, Y and K

5. Using Pascal or BASIC, write a program segment that will accept an integer as input.

The program segment will print that integer and the value of that integer multiplied by 2 [מכפלתו ב-2].

Section Two (50 points)

In this section, there are questions for two different tracks [מסלולים].

You must answer only questions for the track in which you studied:

Basics of Programming ב' [יסודות התכנות ב'] or Software Tools and their Applications [כלי תוכנה ויישומיהם], according to the instructions for that track.

Basics of Programming ב' [יסודות התכנות ב']

If you studied in this track, answer three questions:

Question 6 (required question – 10 points)

and two of the questions 7-9 (each question – 20 points).

Answer Question 6 – Required!

6. A program segment is shown below written in Pascal and BASIC.

Using a trace table, follow the execution of the program segment for the input: 0, 1, 8, 7 and write what will be printed.

Pascal

```
SUM := 0;
FOR I := 1 TO 4 DO
BEGIN
    READLN (A);
    SUM := SUM + A;
    IF I > SUM THEN
        WRITELN ('***');
END;
WRITELN (SUM);
```

BASIC

```
SUM = 0
FOR I = 1 TO 4
    INPUT A
    SUM = SUM + A
    IF I > SUM
        PRINT "****"
NEXT I
PRINT SUM
```

Answer two of the questions **7-9**.

- 7.** A toll road (a road that drivers must pay to use) is divided into sections. It costs 30 shekels to travel over each section. A driver who travels over more than 8 sections will receive a 10-shekel discount on his final bill. Using Pascal or BASIC, write a program that will accept as input a name of a driver and the number of sections of the toll road that driver traveled. The program will print the driver's name and the amount he needs to pay.
- 8.** A computer repair company has 286 technicians. Using Pascal or BASIC, write a program that will accept the following as input for each technician: the technician's name and the number of repairs he did on a certain day. If the technician did more than 25 repairs that day, the program will print his name and the message "BONUS". The program will also calculate and print the total number of repairs done by all of the company's technicians on that day.
- 9.** The cost of a meal at a restaurant is 9 shekels. Using Pascal or BASIC, write a program that will accept the following as input for each of the restaurant's customers on a given day: the customer's name and the number of meals he ordered. The program will calculate the amount that each customer needs to pay for the meals that he ordered and will print the customer's name and the amount he needs to pay. The program will also count and print the number of customers who came to the restaurant that day. The program will end when "SOF" is entered as a customer name.

Software Tools and their Applications [כלי תוכנה ויישומיהם]

If you studied in this track, answer three questions:

Question **10** (required question – 10 points)

and two of the questions **11-13** (each question – 20 points).

Answer Question **10** – Required!

10. The spreadsheet below shows information regarding the number of times that students arrived late to school during September, October and November.

	A	B	C	D
1	Number of late arrivals			
2	November	October	September	Student
3	2	0	3	David
4	4	4	0	Reut
5	0	1	2	Roe
6	3	6	1	Nir
7	2	1	5	Tami
8				

Four functions are shown below.

Which function should be used if we want the total number of late arrivals among all of the students during the month of September to appear in Cell C8? Copy that function into your answer booklet.

- SUM(C3:A7)
- SUM(C3:C7)
- SUM(C3:B7)
- SUM(A3:A7)

Answer two of the questions **11-13**.

11. Four technicians work at a computer company.

The spreadsheet below shows the number of repairs done by each technician each day of a certain week.

	A	B	C	D	E	F	G	H
1		Number of Repairs						
2		Fri.	Thurs.	Wed.	Tues.	Mon.	Sun.	Technician
3		8		23	19		12	Yoram
4		9	34	21	13	23	14	Yosefa
5		11	23	9	11	14	16	Mickey
6		15	18	15	9	18	22	Roni
7								

- א. In Cell A3, write a function to find the number of days that Yoram worked.
- ב. In Cell A6, write an expression or function to calculate the total number of repairs done by Yosefa, Mickey and Roni, Sunday through Friday.
- ג. In Cell D7, write a function to find the smallest number of repairs done on Wednesday.

12. A toll road (a road that drivers must pay to use) is divided into sections. Each section costs the same amount to use.

The spreadsheet below shows the names of drivers who used the toll road and the number of sections of the road they each traveled.

	A	B	C
1		No. of sections traveled	Driver
2		2	Yossi
3		8	Dana
4		3	Shalom
5		10	Rafaella
6			

- א. In Cell A2, write a function that will cause a 1 to appear if the number of sections that Yossi traveled is less than 8. Otherwise, a 0 will appear.
- ב. Copy the function that you wrote for Item א into Cells A3, A4 and A5. Write the value that will appear in each of the following cells: A2, A3, A4 and A5.
- ג. In Cell B6, write an expression or function to calculate the total number of sections of the road traveled by all of the drivers.

13. A cafe has several items on its menu.

The spreadsheet below shows the number of orders of each menu item on a given day.

	A	B	C	D	E
1		No. of Orders			
2		Evening	Lunchtime	Morning	Item
3		36	58	25	sandwich
4		41	25	53	cake
5		28	42	7	ice cream
6		47	61	2	pizza
7					

- א. In Cell A3, write an expression or function to calculate the number of sandwiches ordered over the course of the entire day.
- ב. In Cell B7, write an expression or function to calculate the average number of items ordered in the evening.
- ג. In Cell C7, write an expression or function to calculate the total number of items ordered at lunchtime.

Good Luck!

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בהצלחה!

זכות היוצרים שמורה למדינת ישראל.
 אין להעתיק או לפרסם אלא ברשות משרד החינוך.