

Computer Science

מדעי המחשב

Instructions for examinees

הוראות לנבחן

א. Duration of the exam: Two hours

א. משך הבחינה: שעותיים.

ב. Exam structure and breakdown of points:

ב. מבנה השאלון ומפתח ההערכה:

This exam has three parts.

בשאלון זה שלושה פרקים.

Part One — (3×10) — 30 points

פרק ראשון — (10×3) — 30 נקודות

Part Two — $(1 \times 10) + (2 \times 20)$ — 50 points

פרק שני — $(10 \times 1) + (20 \times 2)$ — 50 נקודות

Part Three — (1×20) — 20 points

פרק שלישי — (20×1) — 20 נקודות

Total — 100 points

סה"כ — 100 נקודות

ג. Material that may be used during the exam:

ג. חומר עזר מותר בשימוש:

All material, except for a programmable computer.

כל חומר עזר, מלבד מחשב הניתן לתכנות.

Write only in the answer booklet. Use separate pages for everything you want to use as draft material (outlines, calculations, etc.).

כתוב במחברת הבחינה בלבד, בעמודים נפרדים, כל מה שברצונך לכתוב כטיוטה (ראשי פרקים, חישובים וכדומה).

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!

רשום "טיוטה" בראש כל עמוד טיוטה. רישום טיוטות כלשהן על דפים שמחוץ למחברת הבחינה עלול לגרום לפסילת הבחינה!

Good Luck!

בהצלחה!

Questions

Part One (30 points)

Answer all three questions 1-3 (each question – 10 points).

1. A program segment written in Pascal is shown below.

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 15 and 30.

```
A1 := 50;  
READLN (A2);  
B := (A1 - A2) * 2;  
WRITELN (A1, A2, B);  
C := A2 - A1;  
C := ABS (C);  
WRITELN (C);
```

2. A program segment written in Pascal is shown below.

Using a trace table, follow the execution of the program segment and write what will be printed.

For the input, choose a number greater than 10.

```
Y := 5;  
READLN (X);  
Y := X - Y;  
S := 'GOOD';  
T := 'LUCK';  
WRITELN (S, T, 'IS', Y);
```

3. Write a program segment in Pascal that will accept three integers as input.

The program segment will print the sum of the three numbers and the product of the first two numbers that were input.

Part Two (50 points)

Answer three questions:

Question 4 (required question – 10 points)

and two of the questions 5-7 (each question – 20 points).

Answer Question 4 – required!

4. A program segment written in Pascal is shown below.

Using a trace table, follow the execution of the program segment for the input (in this order):

2, 1, 9, 0,

and write what will be printed.

```
NUM := 1;  
FOR K := 1 TO 4 DO  
  BEGIN  
    READLN (A);  
    NUM := NUM * A;  
    IF (NUM > K*5) THEN  
      WRITELN ('$$$$');  
  END;  
  WRITELN (NUM);
```

Answer two of the questions 5-7.

5. Towards the end of the year, the "Mesibale" ["מסיבהלה"] company announced a special deal for end-of-year parties: If 100 or fewer people participate in a party, the admission fee is 50 shekels per person, and if more than 100 people participate, the admission fee is 45 shekels per person.

Write a program in Pascal that will accept the name of the party's organizer and the number of participants.

The program will print the name of the party organizer, the admission fee per person, and the total of the admission fees for all the party participants.

6. 104 telephonists work for a telemarketing company.

Write a program in Pascal that will accept for each telephonist his name and the number of telephone calls he made on a given day.

If the telephonist made more than 30 calls, the program will print his name and the message, "YOU ARE THE BEST".

In addition, the program will calculate and print the total number of telephone calls made by all the telephonists on that day.

7. The price of admission to the "Kef" ["כיף"] swimming pool is 30 shekels for a child and 45 shekels for an adult.

Write a program in Pascal that will accept for each family that comes to the swimming pool on a given day: the family name, the number of children, and the number of adults.

The program will calculate for each family the admission price for the entire family.

The program will print for each family the family name and the admission price for the entire family.

The program will exit when it receives "STOP" as input for the family name.

Part Three (20 points)

Answer one of the questions 8-9.

8. Given: a one-dimensional array ARR of size 75, which contains integers.

Write a program in Pascal that accepts as input two positive integers N1 and N2 that are smaller than 75, and $N2 > N1$.

You do not need to check the validity of the input.

The program will calculate the sum of the elements from the N1th position in the array to the N2th place in the array (including the N1th and the N2th elements).

If the sum is greater than 158, the program will print the first N1 elements in the array.

Otherwise, the program will print the elements from the N2th position to the end of the array.

Note: You do not need to write the code that reads in the elements of the array.

9. Given: a one-dimensional array B of size 50, which contains integers.

Write a program in Pascal that checks the elements of the array. If the element is greater than or equal to zero, the program will replace it with the number 1. If the element is negative, the program will replace it with the number -1.

In addition, the program will print the number of array elements whose values are greater than or equal to zero.

Note: You do not need to write the code that reads in the elements of the array.

Good Luck!

בהצלחה!