



The King Hussein School for Computing Sciences
Department of Computer Science
11103 - Structured Programming - Spring 2024

Midterm Exam

Full Name:

Student ID:

Question	Points	Score
1	8	A:
		B:
		C:
2	5	
3	10	
4	7	
Total	30	

Circle your section:

- Dr. Rawan Ghnemat (SuTuTh 9-10)
- Dr. Rawan Ghnemat (SuTuTh 12-13)
- Dr. Rawan Ghnemat (MoWe 8-9½)

- Dr. Samer Sawalha (SuTuTh 8-9)
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- Dr. Ahmad Klaib (SuTuTh 11-12)
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- Dr. Osama Alhaj Hasan (MoWe 11-12½)
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- Dr. Abdullah Aref (MoWe 14-15½)
- Dr. Amer Al-Badarneh (SuTuTh 12-13)

Monday 15/4/2024

Question 1 (8 points)

A. [4 points] Write a program that repeatedly reads two integers and prints their sum. The program must stop when the user enters two zeroes.

Example:

```
Enter two numbers: 1 2
The sum is: 3
Enter two numbers: 0 5
The sum is: 5
Enter two numbers: 0 0
Good bye!
```

B. [3 points] Implement a function named **fillEven**. The function receives an array of integers and its size. The function must fill the array with *random even* integers in the range $[0, 100]$.

C. [1 point] Write a piece of code that defines an array of size 50 and calls function **fillEven** to fill the array with random even numbers in the range $[0, 100]$.

Question 2 (5 points)

Show the output of the code on the right in each of the cases shown below.

1. If $N = 1$ and $a[] = "a"$

2. If $N = 2$ and $a[] = "ab"$

3. If $N = 1000$ and $a[] = "ffffffff ..."$

4. If $N = 1000$ and $a[] = "BeBositiveBeBositiveBeBositiveBeBositive ..."$

```
for (int i = 0; i < N; i++)
    for (int j = i + 1; j < N; j++)
        if (a[i] == a[j])
            a[j] = '\\0';

int count = 0;
for (int i = 0; i < N; i++)
    if (a[i] != '\\0')
        count++;
printf("%d", count);
```

Question 3 (10 points)

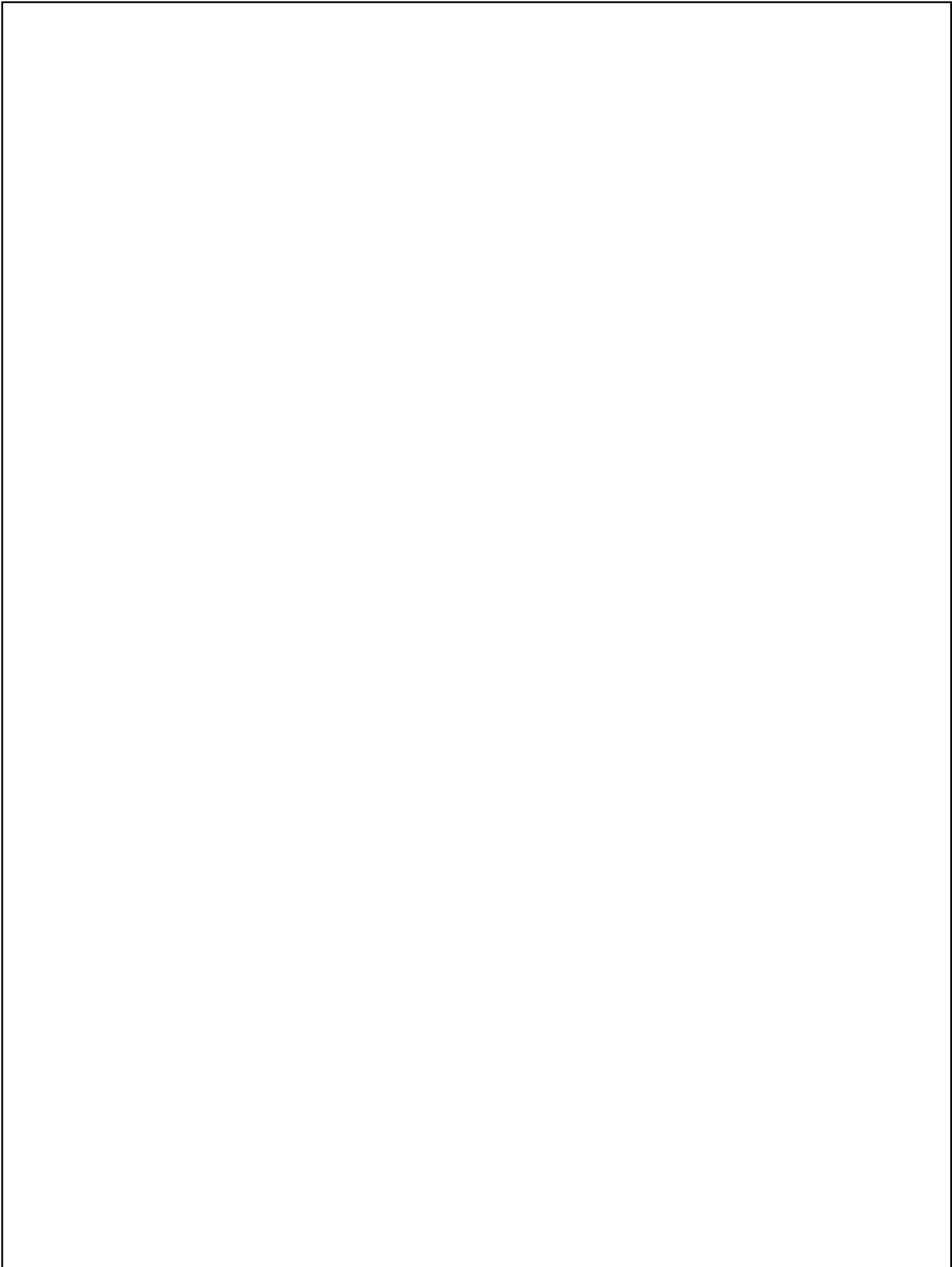
Implement a function named **removeChar**, which receives a string (null-terminated array of characters), and a character **chr**. The function must remove the first occurrence of the character **chr** from the string and return the index of the removed character. If **chr** is not in the string, the function returns **-1**.

Examples:

str before	chr	str after	return value
"programming"	'r'	"pogramming"	1
"programming"	'z'	"programming"	-1
"a"	'a'	""	0

Note. You are not allowed to use the library `<string.h>`

Provide your answer in the following page.



Question 4 (7 points)

A. [2 points] Implement a function named **numLength**, which receives a positive integer x and returns the number of digits in x . For example if $x = 549$, the function returns 3, and if $x = 9$, the function returns 1.

B. [5 points] Implement a function named **generate**, which receives two positive integers: **seed** and N . The function prints a sequence of N numbers generated from the **seed** as follows:

- Multiply **seed** by 127.
- Remove the first and last digits of the result.
- Print the resulting number and use it as the new **seed** for the next iteration.

Examples:

seed = 7, N = 5:

$7 \times 127 = 889 \rightarrow 8$
 $8 \times 127 = 1016 \rightarrow 1$
 $1 \times 127 = 127 \rightarrow 2$
 $2 \times 127 = 254 \rightarrow 5$
 $5 \times 127 = 635 \rightarrow 3$

seed = 713, N = 4:

$713 \times 127 = 90551 \rightarrow 55$
 $55 \times 127 = 6985 \rightarrow 98$
 $98 \times 127 = 12446 \rightarrow 244$
 $244 \times 127 = 30988 \rightarrow 98$

seed = 4, N = 6:

$4 \times 127 = 508 \rightarrow 0$
 $0 \times 127 = 0 \rightarrow 0$
 $0 \times 127 = 0 \rightarrow 0$
 $0 \times 127 = 0 \rightarrow 0$
 $0 \times 127 = 0 \rightarrow 0$
 $0 \times 127 = 0 \rightarrow 0$

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