Department of Computer Engineering
Department of Software Engineering
CENG113 / SENG113 - Computer Programming 1
Fall 2021 - 2022

Lab Guide #10 – Week 11

OBJECTIVE : - One dimensional arrays with functions as input and output parameters
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Q1.

- **a)** Write a function that gets an integer number, then if it is a prime number returns 1, otherwise returns 0. **Prime number is a number which can only divisible by 1 and itself**.
- **b)** Write a function that read the file content into an integer array and returns its actual size.
- **c)** Write a void function that gets two same sized integer arrays and the size of them to store the prime numbers in the first array into the other array by using the function in **part a**. You may also need the actual size of the prime numbers' array.

Write a main program that gets several numbers from a file named numbers.txt, then displays the prime numbers stored into an array by following the steps **a, b,** and **c** above.

numbers.txt
5 10 12 7 9 3 15 47 89 35 31 17 69 14

Example Run:
17
31
89
47
3
7
5

Q2.

Write a function **search** to take a one-dimensional array and a value then check if the value exists in the array or not. If the value exists, the function returns the position of the value, else returns -1. If the value exits more than once, the function will return the position of the first occurrence.

Write a main program to input the ids and number of worked years of 5 employees from two text files (employee_id.txt and workyears.txt) into two separate arrays, output the id of the first employee who has worked for n years, n is getting from the user.

employee_id.txt

```
111 222 333 444 555
```

workyears.txt

```
10 5 25 3 9
```

Example Run:

```
Enter the year which you want to search: 9

First employee id who has worked for 9 years is 555
```

Q3.

Write a function that gets a sentence, reverses the words with the even length and returns the new form of the sentence.

Write a program that reads the sentences from a file named **mytext.txt,** reverse the words with the even lengths and writes the sentences to a new file named **reversed.txt** by using the function described above.

mytext.txt

```
the technology has been completely reengineered
for the larger iPad surface making it extremely
and responsive iPad responds with incredible
And it does just what you want it to
```

reversed.txt

```
the ygolonhcet has neeb yletelpmoc dereenigneer
for the regral daPi surface gnikam ti extremely
and evisnopser daPi sdnopser htiw elbidercni
And ti seod tsuj tahw you tnaw ti ot
```

Example Run:

```
reversed.txt is created.
```

Q4.

An **acrostic** (from the late Greek *akróstichon*, from *ákros*, "top", and *stíchos*, "verse") is a poem or other form of writing in an alphabetic script, in which the first letter, syllable or word of each line, paragraph or other recurring feature in the text spells out a word or a message.

- Write a function that takes a character as an **input** parameter, which stores the first letter of a line (read from the text file), a character array (**acrostic[]**) and its size (**i**) as **output** parameters. Acrostic array will be used to store the first letter. **Note**: Remember to increment the value of i after this operation.

Write a main program that displays acrostic of each line read from text file name**d text.txt** by using the function above.

Example Run:

```
s
h
a
n
g
r
i
l
l
a
```

text.txt

```
since the beginning of time,
he's been looking for some peace of mind,
after goodness and evil was created,
neither heaven nor hell had participated,
graceful and gifted one then said,
remember how i've sincerely prayed,
it was indeed desperation,
like trying to avoid a perdition,
leant on a mossy wall, he was dying,
and at the very end, silently crying.
```

Q5.

a) Write a function that decides whether an integer is prime or not. A prime number is a number whose divisors are only 1 and itself.

b) Write a function that decides whether an integer is perfect or not. A perfect number is a number where, sum of its divisors except itself is equal to that number. For example; 28 is a perfect number because, its divisors are 1, 2, 4, 7, 14 and sum of these numbers is equal to 28.

c) Write a C program that gets a list of integers from the user until -1 is entered, and displays how many of them are prime and how many of them are perfect using the functions in part a and b. The program also displays the list of prime numbers, and the list of perfect numbers using the function you wrote for Question 1 option 1.

Notice that in parts a and b it is enough to check the divisors until the square root of the given numbers.

Example Run:

```
Enter the integer numbers: 45 7 4 3 5 6 11 16 34 67 23 21 28 17 87 99 -1
There are 16 numbers, 2 of them are perfect and 7 of them are prime
Prime numbers are: 7 3 5 11 67 23 17
Perfect numbers are: 6 28
```