

## CENG 2001 – C Programming - Fall 2020

### Take Home Midterm Exam

3 Questions (100 pts total)

**Deadline: 14/12/2020 13:00**

#### Submission Rules:

- Write all your solutions as handwritten on to a set of A4 papers.
- Write "CENG 2001 – C Programming – Fall 2020 – Take Home Midterm Exam" at the beginning of your answer sheet
- Write your name, student id and signature at each page!
- Scan your handwritten answers by a scanner or a camera
- Convert them to a single PDF file

1. **(30 Pts)** Write a program that lists prime numbers that a given number is divisible by. The number is get by the user as input.

Examples:

Input: 15, Output: 3,5

Input: 12, Output: 2,3

Input: 32, Output: 2

Input: 17, Output: 17

Input: 780, Output: 2,3,5,13

Hints:

1. Prime number is a positive number that is divisible by only 1 and itself. (e.g., 2, 3, 17,19).
4. Assume that there will be at most 20 prime numbers to list in the output.

2. **(50 Pts)** Write a **function** to check if a Turkish Identity number is valid or not. There are a few mechanisms to check if the identity number is valid.

- a. It has 11 digits
- b. It does not start with 0
- c. Remainder of the sum of first 10 digits after dividing by 10 gives the 11. digit
- d. (There is another rule, but you can ignore it for now)

The function will take a string as argument and will return 1 if it is valid and 0 if it is invalid. It has to check all three rules (a,b,c) and must return 1 only it satisfies all three rules.

Example: Turkish Identity Number of Mustafa Kemal Atatürk

**10000000146**

- It has 11 digits ✓
- It does not start with 0 ✓
- $(1 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 1 + 4) \% 10 = 6$  and it is equal to 11. Digit ✓

The function returns 1

Do not write the main program. Create a function only but with proper function definition, return values.

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3. (20 Pts) Write a program that takes a string from the user as input and finds the number of occurrences of "the" in the string. It displays the number of occurrences as output.

Example: The most interesting words that include the are therapeutically, openmouthed, theory, etherealization, mathematical.

Output: 7

①

```
#include <stdio.h>
```

```
int checkPrime(int number);
```

```
void main ()  
{
```

```
    int input;
```

```
    printf("Input: ");
```

```
    scanf("%d", &input);
```

```
    printf("Output: ");
```

```
    for(int i=2; i<=input; i++)
```

```
{
```

```
        if (input % i == 0 && checkPrime(i) == 1)
```

```
{
```

```
            printf("%d ", i);
```

```
}
```

```
}
```

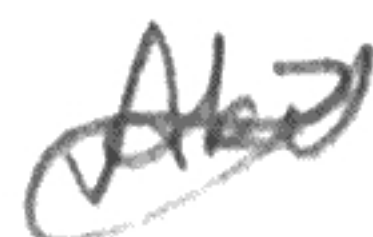
```
}
```

```
// THIS PROGRAM CONTINUES ON PAGE 3.
```

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①

```
int checkPrime(int number) {  
    for (int i = 2; i < number; i++) {  
        if (number == 2) {  
            return 1;  
            // True  
        }  
        else if (number % i == 0) {  
            return 0;  
            // False  
        }  
        else {  
            continue;  
        }  
    }  
    return 1;  
    // True  
}
```

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②

```
#include <stdio.h>
```

```
#include <string.h>
```

```
int checkIdentityNumber(char *id)  
{
```

```
    int len = strlen(id);
```

```
    int sum;
```

```
    for (int i = 0; i < len - 1; i++)
```

```
        sum += id[i] - 48;
```

```
    if (len != 11)
```

```
        return 0; // Invalid
```

```
    else if (id[0] == '0')
```

```
        return 0; // Invalid
```

```
    else if (sum % 10 != id[10] - 48)
```

```
        return 0; // Invalid
```

```
    else
```

```
        return 1; // Valid
```

```
}
```

```
// I DIDN'T USE CURLY BRACES TO FIT IT.
```

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Midterm Exam

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③      #include <stdio.h>

```
void main()  
{  
    char string[250];  
    gets(string);  
    int i=0, j=1, k=2;  
    int count=0;  
    while (string[i] != '\0')  
    {  
        if ((string[i] == 't' || string[i] == 'T') &&  
            (string[j] == 'h' || string[j] == 'H') &&  
            (string[k] == 'e' || string[k] == 'E'))  
            count++;  
        i++;  
        j++;  
        k++;  
    }  
    printf("%d\n", count);  
}
```