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<table>
<tr><td rowspan="2">Field of study

Computer Science</td><td colspan="2">Laboratory
Fundamentals of Programming 2</td></tr>
<tr><td rowspan="2">Exercise topic

Encoding and Decoding</td><td rowspan="2">Performed by:</td></tr>
<tr><td>Dean's group</td></tr>
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1. Introduction

In computers, encoding is the process of putting a sequence of characters (letters, numbers, punctuation, and certain symbols) into a specialized format for efficient transmission or storage. Decoding is the opposite process - the conversion of an encoded format back into the original sequence of characters.

2. Description of Codes

2.1) Libraries

```
1   #include <stdio.h>
2   #include <string.h>
3   #include <stdlib.h>
```

Table 1.0

C Standard library functions or simply C Library functions are inbuilt functions in C programming.

The prototype and data definitions of these functions are present in their respective header files. To use these functions we need to include the header file in our program. For example,

If you want to use the printf() function, the header file <stdio.h> should be included.

<stdio.h> Standard Input/Output functions

<string.h> String handling functions

<stdlib.h> Standard Utility functions

2.2) Functions

I used two different functions for encoding and decoding

```
5   void encrypt(char password[],int key)
6   {
7       unsigned int i;
8       for(i=0;i<strlen(password);++i)
9       {
10          password[i] = password[i] - key;
11      }
12  }
13
14  void decrypt(char password[],int key)
15  {
16      unsigned int i;
17      for(i=0;i<strlen(password);++i)
18      {
19          password[i] += password[i] + key;
20      }
21  }
```

Table 2.0

[In the table 2.0; fifth line we can see Void and second words is ‘ encrypt ’ is only function name. And what's in parentheses char and int these are data types.]

Void : It means “no type”, “no value” or “no parameters”, depending on the contect.

- A function does not return value
- A function does not accept parameters
- A pointer does not have a specific type and could point to different types

Variables :

Char (use of) : char is the most basic data type in C language. It stores a single character and a single byte of memory in almost all compilers.

Int (use of): short for "integer " is a fundamental variable type built into the compiler and used to define numeric variables holding whole numbers.

Unsigned int (use of): Unsigned Integers are just like integers (whole numbers) but have the property that they don't have a + or - sign associated with them.

String : The **strlen()** function calculates the length of a given string. The **strlen()** function takes a string as an argument and returns its length. The returned value is of type size_t (an unsigned integer type).

3.) Loops (for)

```
 8      for(i=0;i<strlen(password);++i)
 9      {
10          password[i] = password[i] - key;
11      }

17      for(i=0;i<strlen(password);++i)
18      {
19          password[i] += password[i] + key;
20      }
```

The for loop in C language is used to iterate the statements or a part of the program several times. It is frequently used to traverse the data structures like the array and linked list.

4.) Main Functions

```
22  int main()
23  {
24      char password[20] ;
25      printf("Press to strings: ");
26      scanf("%s",password);
27      printf("\n");
28
29
30      encrypt(password,20);
31      printf("Encrypted value = %sn \n\n",password);
32
33      decrypt(password,20);
34      printf("Decrypted value = %sn \n\n",password);
35      return 0;
36  }
37  /*I tried to do my project using two functions.
38  Actually, while I was doing research on this subject,
39   most of the training videos explained using the C++ software language.*/
40
```

A main() function is a user-defined function in C that means we can pass parameters to the main() function according to the requirement of a program. An operating system always calls the main() function when a programmers or users execute their programming code.

Int main() function: An **int** is a keyword that references an integer data type. An **int** data type used with the **main()** function that indicates the function should return an integer value. When we use an int main() function, it is compulsory to write return 0; statement at the end of the main() function. The return 0; statement represents that the program has been successfully executed, whereas any other statement represents the unsuccessful termination of the program.

printf use for writing on the display

scanf use of: we can get some value from the user

& use of for address