HOMEWORK 0

Software Project (0368-2161)

Due Date(Optional): 17/03/2022

1 Introduction

The purpose of this assignment is to get familiar with basic coding in C language. The assignment includes the following:

1. Create your first C programs.
2. Compiling, debugging and running of your program.

2 Development Environment

Students may work in any development environment they like. However, we encourage you to use VScode your development tool (we will not support issues regarding other IDEs or operating systems other than Linux or Windows). Your code should run properly on Nova-the faculty server.

2.1 IDE

How to set VScode for C ? https://code.visualstudio.com/docs/languages/cpp

2.2 NOVA Server

You might find all the details about working with NOVA at:
https://www.cs.tau.ac.il/system/servers

Make sure your submissions are not available to the public. At nova, place your files into a new directory and run:

```
> chmod 0700 <dir-name>
```

2.3 Basic Shell Commands

```
> pwd
# Prints the full path name of the current working directory to the standard output.
# (The path name is relative to the root directory which is the first directory in Linux).

> ls <dir>
# Lists the content of the directory "dir" (Both files and directories).
# If no parameters are given, the result is the content of the current working directory.

> cd <dir>
# Changes the current directory to be dir. Use the following shortcuts:
# "." {This is a shortcut for the current directory.
# ".." {This is a shortcut for the parent directory in the hierarchy.
# "~" {this is a shortcut for your home directory.

> mkdir <dirName>
# Creates a new directory with the name dirName.

> cp [file1] [file2]...[fileK] [dir]
# Copies file1,file2,...,fileK to the directory "dir".
# Note: To copy an entire directory (recursively copy a directory) use {r flag.

> rm [file1] [file2]...[fileK]
# Removes file1,file2,...,fileK.

> man [command]
# The man command is used to display the manual page of the command "command".
# Note: you can navigate through the manual page using the arrows in the keyboard.
# To exit the manual page press "q"

> diff [file1][file2]
# Prints the difference between the two files (file1 and file2)
# Note: Use the man command to see the manual page of the command "diff".

> chmod[options][file]
# Changes the permissions of [file] according to [options].
# Note: When transferring executable files to nova, you need to execute:
```

3 Assignment Description

In this assignment you will write your first C program. The program receives a number in base a and converts it to base b. For example, if you receive the number 101 in base 2 (binary base) and you are asked to convert it to base 10 (decimal) then the result should be 5. The user will first enter the base in which the number is represented (base a) and then the desired base (base b). Afterwards the user inputs the number she wants to convert as a series of chars.

The behavior of the program is as follows:

1. The program receives an **integer** representing base a. The program asks the user to input the

base by printing the following message:

```
> Please enter the numbers base:
```

(a) If the user enters a base $a \notin [2, 16]$ or non-integer base, then the program will print the following error and terminates:

```
> Invalid input base
```

2. Afterwards, the program receives an integer representing base b. The program asks the user to input the base by printing the following message:

```
> Please enter the desired base:
```

(a) If the user enters a base $b \notin [2, 16]$ or non-integer base, then the program will print the following error and terminates:

```
> Invalid desired base
```

3. The program will ask the user to enter a number in base a by printing the following message:

```
> Please enter a number in base <a>:
# Where <a> is the value of the base a.

# For example if a=3 then the message is:
> Please enter a number in base 3:
```

(a) The user will input the number as a series of chars, if at any point the users enters an invalid char (i.e. a character that is not in base a) then the program will print the following error and terminates:

```
> Invalid number!
```

4. Finally, the program will convert the number from base a to base b and print the following message:

```
> The result is: <res>
# Where <res> is the number received in (section 3) printed in base b.
```

Assumptions and requirements:

- For reading single characters from the user you can consider using the getchar() command.
- You shouldn't use arrays.
- You are encouraged to divide your code into functions.
- In case the base has letters in the numbers, the letter must be lower case.
  For example: $2022_{10} = 7e6_{16}$.

3.1 Compile and Running

The program must compile cleanly (no errors, no warnings) when running the following command:

```
> gcc -ansi -Wall -Wextra -Werror -pedantic-errors -o ex0 ex0.c
```

After successfully running the above command, a binary file called ex0 will be created. Now you can run your program by executing the following line on Nova:

```
> ./ex0
```

See example below:

```
> ./ex0
Please enter the numbers base:
16
Please enter the desired base:
10
Please enter a number in base 16:
a4
The result is: 164
```

3.2 Submission

Please submit a file named id1_id2_assignment_0.c where id1 and id2 are the ids of the partners.

3.3 Remarks

For any question regarding the assignment, please post at the HW_0 discussion forum.