

**Recep Tayyip Erdogan University**

**Faculty of Engineering and Architecture**

**Computer Engineering**

CE103- Algorithms and Programming I

**Homework-2 Solution (Week-4)**

**Fall Semester, 2020-2021**

| **Instructor** | **Asst. Prof. Dr. Uğur CORUH** |
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| **Google Classroom Code** | **ouw44uk** |
| **Publish Date** | **04.11.2020** |
| **Due Date** | **13.11.2020 17:00** |

**Complete the following homework requirements, prepare them in the format given in the link below until the deadline and time, and upload them to the related assignment in the classroom.**

https://drive.google.com/file/d/1yqSXZZ3346iIqotb\_e\_yzaryfxEXE0fR/view?usp=sharing **Grades:**

| Problem-1 | 40 points |
| --- | --- |
| Problem-2 | 60 points |
| **Total** | **100** points |

Sayfa **1/7**

**Problem-1**: *Convert Number to Strings (40 points)*

In this application you will develop a C program that converts console numeric inputs to string. Your application must support the range between *999.999.999 and 0 (999.999.999>n>0) Sample Output*

Build Time: Oct 28 2020 01:55:02

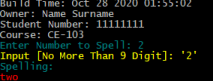
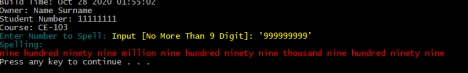
Owner: Name Surname

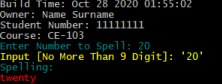
Student Number: 11111111

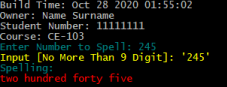
Course: CE-103

Enter Number to Spell: Input [No More Than 9 Digit]: '999999999' Spelling:

nine hundred ninety nine million nine hundred ninety nine thousand nine hundred ninety nine







Sayfa **2/7**

**Solution-1**

/\* C program to print a given number in words. The program handles till 9 digits numbers and can be easily extended to 20 digit number \*/ #include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <windows.h> // WinApi header

// strings at index 0 is not used, it is to make array // indexing simple

char**\*** one**[] = {** ""**,** "one "**,** "two "**,** "three "**,** "four "**,** "five "**,** "six "**,** "seven "**,** "eight "**,** "nine "**,** "ten "**,** "eleven "**,** "twelve "**,** "thirteen "**,** "fourteen "**,** "fifteen "**,** "sixteen "**,** "seventeen "**,** "eighteen "**,** "nineteen " **};**

// strings at index 0 and 1 are not used, they is to // make array indexing simple

char**\*** ten**[] = {** ""**,** ""**,** "twenty "**,** "thirty "**,** "forty "**,** "fifty "**,** "sixty "**,** "seventy "**,** "eighty "**,** "ninety " **};**

// n is 1- or 2-digit number

void numToWords**(**int n**,** char**\*** s**,**char**\*** out**,**int**\*** outlen**) {**

int index **=** 0**;**

int len **=** 0**;**

// if n is more than 19, divide it

**if (**n **>** 19**) {**

len **=** strlen**(**ten**[**n **/** 10**]);**

memcpy**(**out**,**ten**[**n **/** 10**],**len**);**

index**+=**len**;**

len **=** strlen**(**one**[**n **%** 10**]);**

memcpy**(**out**+**index**,**one**[**n **%** 10**],**strlen**(**one**[**n **%** 10**]));** index**+=**len**;**

**}**

**else**

**{**

len **=** strlen**(**one**[**n**]);**

memcpy**(**out**+**index**,**one**[**n**],**len**);**

index**+=**len**;**

**}**

// if n is non-zero

**if (**n**)**

**{**

len **=** strlen**(**s**);**

**if(**len**>**0**)**

**{**

memcpy**(**out**+**index**,**s**,**len**);**

index**+=**len**;**

Sayfa **3/7**

**}**

**}**

**\***outlen **=** index**;**

**}**

// Function to print a given number in words

void convertToWords**(**long n**,**char**\*** out**,**int**\*** outlen**)**

**{**

// stores word representation of given number n

char**\*** buff **=** out**;**

int bufflen **=** 0**;**

long extract **=** 0**;**

long digits **=** 0**;**

**if(**n**>**999999999**)**

**{**

printf**(**"Number is too big. Not supported try numbers smaller than 1.000.000.000\n"**);**

**return;**

**}**

//hundred millions

digits **= (((**n **/** 1000000**)-(**n **/** 1000000**)%**100**)/**100**);**

numToWords**(**digits**,** "hundred "**,**buff**,&**bufflen**);**

**\***outlen **=** bufflen**;**

extract**+=**digits**\***100**;** //get million hundred partition

//millions

digits **= ((**n **/** 1000000**)%**100**);**

numToWords**(**digits**,** "million "**,**buff**+\***outlen**,&**bufflen**);**

**\***outlen **+=** bufflen**;**

extract**+=**digits**;** //add extracted part to ten partition

extract**\*=**10**;** // this is for low level digits. result is cropped.

//hundred thousands

digits **= (((**n **/** 1000**)-(**n **/** 1000**)%**100**)/**100**) -** extract**;** //calculate hundred digits.

numToWords**(**digits**,** "hundred "**,**buff**+\***outlen**,&**bufflen**);**

**\***outlen **+=** bufflen**;**

// handles digits at thousands and tens thousands

// places (if any)

digits **= ((**n **/** 1000**) %** 100**);**

numToWords**(**digits**,** "thousand "**,**buff**+\***outlen**,&**bufflen**);**

**\***outlen **+=** bufflen**;**

// handles digit at hundreds places (if any)

digits **= ((**n **/** 100**) %** 10**);**

numToWords**(**digits**,** "hundred "**,**buff**+\***outlen**,&**bufflen**);**

**\***outlen **+=** bufflen**;**

// if (n > 100 && n % 100)

// out += "and ";

Sayfa **4/7**

// handles digits at ones and tens places (if any)

digits **= (**n **%** 100**);**

numToWords**(**digits**,** ""**,**buff**+\***outlen**,&**bufflen**);**

**\***outlen **+=** bufflen**;**

**}**

// Driver code

int main**()**

**{**

char spellBuffer**[**512**] = {**0**};**

int spellBufferLen **=** 0**;**

// long handles upto 9 digit no

// change to unsigned long long int to

// handle more digit number

long number **=** 0**;**

char buffer**[**12**+**1**] = {** 0 **};**

HANDLE m\_hConsole**;**

WORD m\_currentConsoleAttr**;**

CONSOLE\_SCREEN\_BUFFER\_INFO csbi**;**

int k**;**

int currentVal**;**

printf**(**"Build Time: %s %s\n"**,** \_\_DATE\_\_**,** \_\_TIME\_\_**);**

printf**(**"Owner: Name Surname\n"**);**

printf**(**"Student Number: 11111111\n"**);**

printf**(**"Course: CE-103\n"**);**

//retrieve and save the current attributes

m\_hConsole**=**GetStdHandle**(**STD\_OUTPUT\_HANDLE**);**

**if(**GetConsoleScreenBufferInfo**(**m\_hConsole**, &**csbi**))**

m\_currentConsoleAttr **=** csbi**.**wAttributes**;**

//change the attribute to what you like

SetConsoleTextAttribute **(**

m\_hConsole**,**

FOREGROUND\_RED **|**

FOREGROUND\_GREEN**);**

//change the attribute to what you like

SetConsoleTextAttribute **(**

m\_hConsole**,**

FOREGROUND\_GREEN **|** FOREGROUND\_BLUE**);**

printf**(**"Enter Number to Spell: "**);**

scanf**(**"%9[0123456789]"**,** buffer**);**

SetConsoleTextAttribute **(**

m\_hConsole**,**

FOREGROUND\_INTENSITY **|** FOREGROUND\_RED **|** FOREGROUND\_GREEN**);**

printf**(**"Input [No More Than 9 Digit]: '%s'\n"**,** buffer**);**

Sayfa **5/7**

| number **=** atol**(**buffer**);**    // convert given number in words  convertToWords**(**number**,**spellBuffer**,&**spellBufferLen**);**  SetConsoleTextAttribute **(**  m\_hConsole**,**  FOREGROUND\_GREEN **|** FOREGROUND\_BLUE**);**  printf**(**"Spelling: \n"**);**  SetConsoleTextAttribute **(**  m\_hConsole**,**  FOREGROUND\_INTENSITY **|** FOREGROUND\_RED**);**  printf**(**"%s\n"**,** spellBuffer**);**  //set the ttribute to the original one  SetConsoleTextAttribute **(**  m\_hConsole**,**  m\_currentConsoleAttr**);**  getchar**();** // wait  **return** 0**;**  **}** |
| --- |

Sayfa **6/7**

Sayfa **7/7**