Department of Information Systems and Technologies

CTIS 152 – Data Structures and Algorithms

Fall 2024 - 2025

Lab Guide #15 – Week 10-2

OBJECTIVE : Binary Files , Stack Library and Simple Stack Operations

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Q1.

a) Write a C program that converts the text file content which is named currency.txt, to the binary file currency.bin and shows a message to the screen binary file is created. File contains the country abbreviations and 1 unit price of dollar and euro equivalent of the country's currency values.

Create the structure to get the file content;

```
typedef struct {
       char country[5];
       double dolarUnit;
       double euroUnit;
}curr_t;
```

Write a function;

- **convertTxtToBin** that gets the file pointers of input and output files, converts the txt content to the binary file and returns the line number of the txt file.

```
currency.txt
TUR 8.33 9.66
JAP 0.0096 0.0082
BRI 1.30 1.11
IND 0.013 0.011
CHI 0.15 0.13
```

Project Name: LG15_Q1a
File Name: Q1a.cpp

```
Example Run:
FILE created with 5 lines
```

b) Use the file which you create in Q2 part-a, named currency.bin which contains **5 records**. Write a C program that calculates the dollar / euro equivalent of the given money amount according to the given abbreviation of the country.

Write a function;

- **calcPrice** that gets the structure array, abbreviation of the country and money amount which is getting from the user in main part. Function calculates the dollar / euro equivalent of the money and returns the calculated price.

HINT: You can get the user's (dollar / euro) choice, by getting a char ('D'/'E'). Do not forget to check invalid value for the dollar and euro, there is no payment for that condition.

Project Name: LG15_Q1b
File Name: Q1b.cpp

```
Example Run1:
Enter Country Abbreviation:JAP
Enter money ammount:15
Dollar / Euro (D:E):D
You have 0.14 dollar
```

```
Example Run2:
Enter Country Abbreviation:IND
Enter money ammount:250
Dollar / Euro (D:E):e
You have 2.75 euro
```

```
Example Run3:
Enter Country Abbreviation:RE
Enter money ammount:124
NO PAYMENT
```

```
Example Run4:
Enter Country Abbreviation:CHI
Enter money ammount:36
Dollar / Euro (D:E):w
Invalid Currency!NO PAYMENT
```

Copy the stack_int.h file from Moodle to each of your local project folders and modify it when necessary!

Q2. Write a C program that will read several numbers until user enters -1. Validates the odd numbers and puts the odd numbers to the stack then prints all the numbers in a reverse order via usage of a stack.

Project Name: LG15_Q2
File Name: Q2.cpp

Example Run:

```
Enter an odd number: 6
Enter odd number please:3
Enter an odd number: 9
Enter an odd number: 7
Enter an odd number: 4
Enter odd number please:3
Enter an odd number: -1

Stack Content
3 7 9 3
```

Q3. Make the necessary changes in the header file to create a **string** stack.
Write a C program that reads the several words with **size 15** from a binary file named **"words.bin"** into a stack and displays the given words which size is greater than 5 in reverse order.

Project Name: LG15_Q3
File Name: Q3.cpp

Example Run:

```
WORDS IN REVERSE ORDER
***********************
REWIND
RESTAURANT
HYGIENE
DYNAMIC
COOKIE
```

Q4. Make the necessary changes in the header file to create a structure stack.

Write a C program that gets the information of several companies from the binary file named "**companies.bin**". Binary file contains the company foundation year, company name (15 chrs), phone (15 chrs) and url address (50 chrs) for all companies. Then program will display the information of the companies on the screen in reverse order by using a STACK.

Project Name: LG15_Q4
File Name: Q4.cpp

Example Run:

```
Company Year     Name      Phone       Web URL
*********************************************************
    2002         Isbir     4443450 www.isbir.com.tr
    2004      Roketsan     4445444 www.roketsan.com.tr
    2003      Aspilsan     4777965 www.aspilsan.com.tr
    1999      Havelsan     4556895 www.havelsan.com.tr
    1997     Yapikredi     4440444 www.yapikredi.com.tr
    1976         Sayar     4447797 www.sayar.com.tr
```

Additional Questions

AQ.

Write following functions;

- **displayStack** that displays the stack,
- **countStack** that counts the elements of the stack (Stack content does not change!),
- **remMaxStack** that removes the Maximum element from the stack,
- **sendNthToEnd** that `sends` the nth element from the top is sent to the bottom of the stack.

Write a C program that get numbers from the user to fill the stack until a sentinel value is entered (-9 for instance), and then displays a menu, and call the appropriate STACK function according to the user's choice. Examine well the example run.

Example Run:

```
Enter a number: 23
Enter a number: 42
Enter a number: 56
Enter a number: 87
Enter a number: 33
Enter a number: -9

       MENU
************************
1) Count Stack
2) Remove Maximum Element
3) Send Nth To End
4) Exit
Enter your choice: 1

STACK CONTENT
33
87
56
42
23

Number of elements in the stack: 5

       MENU
************************
1) Count Stack
2) Remove Maximum Element
3) Send Nth To End
4) Exit
Enter your choice: 2

STACK CONTENT
33
56
42
23
       MENU
************************
1) Count Stack
2) Remove Maximum Element
3) Send Nth To End
4) Exit
Enter your choice: 3

Enter N: 2

STACK CONTENT
33
42
23
56
       MENU
************************
1) Count Stack
2) Remove Maximum Element
3) Send Nth To End
4) Exit
Enter your choice: 4
```