Department of Information Systems and Technologies

CTIS 152 – Data Structures and Algorithms

Summer 2020 - 2021

Lab Guide #5 – Week 2 – 3

OBJECTIVE : Structures and Pointer Operations

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The %s operator is one used for reading strings of characters in to character arrays using the scanf function.

Q1. Create the structure **game_t** with the following fields.

```
typedef struct{
      char name[20];
      char type[20];
      double price;
      int releaseDate;
} game_t;
```

a) Initialize the data with the following values (**Name**: Fortnite, **Type:** Action, **Price:** 65, **ReleaseDate**: 2017), and then display as shown in the example run.

Example Run:

```
The Game information is:
Name         : Fortnite
Type         : Action
Price        : 65.00 TL
Release Date : 2017
```

Project Name: LG5_Q1a
File Name: Q1a.cpp

b) Get the structure data from the user, and then display as shown in the example run.

Example Run:

```
Enter the information of the game:
Name         : PlanetCoaster
Type         : Video
Price        : 90
Release Date : 2016

The Game information is:
Name         : PlanetCoaster
Type         : Video
Price        : 90.00 TL
Release Date : 2016
```

Project Name: LG5_Q1b
File Name: Q1b.cpp

c) Use Pointer notation for part a.

Example Run:

```
The Game information is:
Name         : Fortnite
Type         : Action
Price        : 65.00 TL
Release Date : 2017
```

Project Name: LG5_Q1c
File Name: Q1c.cpp

d) Rewrite the program so that it will read the information of the game from the file "**games.txt"**, store them into an array of structure, and display the number of products and the information of all games.
(**Use dynamic memory allocation for the array.** The first line of the file consists the number of games.)

games.txt

```
3
ViceCity Action 150 2002
Spelunky Video 75 2008
FIFA19 Spor 190 2018
```

Example Run:

```
There are 3 games

The Game Information:
************************
Name         : ViceCity
Type         : Action
Price        : 150.00 TL
Release Date : 2002
************************
Name         : Spelunky
Type         : Video
Price        : 75.00 TL
Release Date : 2008
************************
Name         : FIFA19
Type         : Spor
Price        : 190.00 TL
Release Date : 2018
************************
```

Project Name: LG5_Q1d
File Name: Q1d.cpp

Q2. a) N11 offers special discount for some products. Discounted products' information (product name, price, discount rate) is kept in the "**n11.txt"** file.

Write a C program that will read all products's information from the file into a structure array (with the maximum size 10), display them with the discounted price and the saved amount on the screen. The program will also display the number of products.

Write the following functions;

- **`readFromFile`** : takes a file pointer and the structure array which keeps the products' information as parameters and reads the information from the file into the array. The function should return the number of products.

- **`displayAllProducts`** **:** takes the product array which keeps the product information and the number of products as parameters, display the product information including discounted price and the saved amount (see the example run).

Example Run:

```
There are 5 products in the market

PRODUCT NAME      PRICE      DISCOUNT  DISC. PRICE   SAVED AMOUNT
************      *********  ********  ***********   ************
Laptop            2799.99 $      %15    2379.99 $       420.00 $
TabuXLGame         294.90 $      %30     206.43 $        88.47 $
Headphones         749.00 $      %20     599.20 $       149.80 $
Projection        2599.90 $       %5    2469.91 $       130.00 $
CoffeMachine       699.90 $      %50     349.95 $       349.95 $
```

n11.txt

```
Laptop 2799.99 15
TabuXLGame 294.90 30
Headphones 749.00 20
Projection 2599.9 5
CoffeMachine 699.90 50
```

Project Name: LG5_Q2a
File Name: Q2a.cpp

b) Use dynamic memory allocation for the Q2a.
(The first line of the file consists the number of products.)

n11.txt

```
5
Laptop 2799.99 15
TabuXLGame 294.90 30
Headphones 749.00 20
Projection 2599.9 5
CoffeMachine 699.90 50
```

Project Name: LG5_Q2b
File Name: Q2b.cpp

Additional Question

AQ. Write C program that gets several student from a file named **"student.txt"**, each line of the file contains a student's **name**, **surname**, **cgpa**, **semester**. Create a **structure array** to get these student from the file. The number of student located into the first line of text file, so **allocate enough memory space for the array**.

Then program calculates and displays the new course credit for each student according to the table shown below;

CGPA	2nd SEMESTER	>= 3rd SEMESTER
CGPA >= 2.00	NO LIMITATION	
1.80 <= CGPA < 2.00	15 credit new course	10 credit new course
CGPA < 1.80	12 credit new course	0 credit new course

student.txt

```
7
NESE TINAZ 1.82 4
AYSEN UMUT 2.05 1
CEREN OZDEMIR 1.60 2
FUAT YILMAZ 3.00 4
OZLEM SARI 1.70 6
TAYFUN CANATAN 2.61 7
ASLI PAKSOY 1.50 3
```

Example Run:

```
NESE TINAZ -----> 10 credit
AYSEN UMUT -->NO COURSE LIMITATION
CEREN OZDEMIR -----> 12 credit
FUAT YILMAZ -->NO COURSE LIMITATION
OZLEM SARI -----> NO NEW COURSE
TAYFUN CANATAN -->NO COURSE LIMITATION
ASLI PAKSOY -----> NO NEW COURSE
```

Project Name: LG5_AQ
File Name: AQ.cpp