

OBJECTIVE: Dynamic memory allocation. Structures.

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Q1. Write a C program that reads one integer list from the user creates one dim array **dynamically**. Displays the comparison results as in the example run. (Use switch statement.)

Use **pointer notation** instead of subscript notation!

Write the following functions;

- **readList** that reads a list of numbers from the user.
- **findSumPro** that finds the sum and product of the elements of a one-dim array.
- **compareSumPro** that finds the sum and product of the elements of a one-dim array using the function findSumPro, and then compares them, and returns **0** if they are equal, **1** if sum is larger, **2** if product is larger.

Example Run#1:

```
Enter the number of values you want to input: 4
Enter list elements:
1 22 3 9
The sum of the elements is LESS than the product of the elements!
```

Example Run#2:

```
Enter the number of values you want to input: 2
Enter list elements:
1 8
The sum of the elements is GREATER than the product of the elements!
```

Example Run#3:

```
Enter the number of values you want to input: 2
Enter list elements:
2 2
The sum of the elements is EQUAL to the product of the elements!
```

Project Name: LG4_Q1

File Name: Q1.cpp

Q2. Create the structure `car_t` with the following fields.

```
typedef struct {  
    char brand[30];  
    int horsepower;  
    char color[15];  
    char bodyType[30];  
} car_t;
```

- a) Initialize the structure data with the following values (**brand**: dodge , **horsepower**: 707, **color**: black, **bodyType**: coupe) and then display as shown in the example run.

Example Run:

```
The car information is:  
Brand: dodge  
Horse Power: 707  
Color: black  
Body Type: coupe
```

Project Name: LG4_Q2a

File Name: Q2a.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 car:  
Brand: Chevrolet  
Horse Power: 450  
Color: red  
Body Type: coupe
```

```
The car information is:  
Brand: Chevrolet  
Horse Power: 450  
Color: red  
Body Type: coupe
```

Project Name: LG4_Q2b

File Name: Q2b.cpp

- c) Use Pointer notation for part a.

Example Run:

```
The car information is:  
Brand: GMC  
Horse Power: 275  
Color: white  
Body Type: SUV
```

Project Name: LG4_Q2c

File Name: Q2c.cpp

Additional Questions

AQ1. Create the structure **movie_t** with the following fields.

```
typedef struct{
    char movie_name[20];
    char type;
    double price;
    int release_year;
}movie_t;
```

Write a program that will read the information of 10 movies from a text file named **movies.txt** and store them into an array of structure.

Example Run:

```
The movie information is:
*****
Name : LittleWomen
Movie type: DVD
Price: 16.3
Release Year: 2020
*****
Name : Bayi
Movie type: DVD
Price: 17.9
Release Year: 2020
*****
Name : MILE22
Movie type: BLUERAY
Price: 10.5
Release Year: 2020
*****
Name : ZANGO
Movie type: BLUERAY
Price: 11.2
Release Year: 2018
*****
Name : Gamonya
Movie type: BLUERAY
Price: 7.9
Release Year: 2019
*****
Name : GreenLand
Movie type: BLUERAY
Price: 9.3
Release Year: 2020
*****
Name : QuietPlace
Movie type: BLUERAY
Price: 5.5
Release Year: 2020
*****
Name : Dolittle
Movie type: DVD
Price: 16.5
Release Year: 2019
*****
Name : JungleCruise
Movie type: DVD
Price: 17.9
Release Year: 2020
*****
Name : BlackWidow
Movie type: BLUERAY
Price: 9.3
Release Year: 2020
```

Project Name: LG4_AQ1
File Name: AQ1.cpp

AQ2. Write a C program that reads the swimmers' information from the text file named "**swimmers.txt**" into a **dynamically** created structure array, each line of the file contains a swimmer's **name**, **surname**, **time to complete the lane**, and **medal info**. The program will select the swimmers for the swimming race according to the below criteria.

The criteria are;

- The time to complete the lane must be less than 160 seconds,
- The swimmer must have a medal (Medal info must be Yes).

Then, it will display the number of selected swimmers and their information with the given format like in the example run.

NOTE: The number of swimmers is located in the first line of the text file.

Project Name: LG4_AQ2
File Name: AQ2.cpp

swimmers.txt

```
12
Martha Randall 165.2 N
Debbie Meyer 187.8 N
Cynthia Woodhead 153.8 Y
Penny Heyns 148.9 Y
Laure Manaudou 175.0 N
Rebecca Soni 199.8 N
Katie Ledecky 210.9 N
Emma McKeon 149.4 Y
Regan Smith 153.3 Y
Natalie Coughlin 172.8 Y
Jenny Thompson 188.1 N
Janet Evans 175.4 Y
```

Example Run:

Swimmer Name	Surname	Time to Complete the Lane	Medal Info
*****	*****	*****	*****
Cynthia	Woodhead	153 seconds 8 milliseconds	Y
Penny	Heyns	148 seconds 9 milliseconds	Y
Emma	McKeon	149 seconds 4 milliseconds	Y
Regan	Smith	153 seconds 3 milliseconds	Y

There are 4 swimmers with medals for swimming race