East West University
Department of Computer Science and Engineering

CSE207 – Data Structures: LAB 01
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Dynamic Memory Allocation and Structure

A. Structure and DMA

1. A grocery shop owner wants to store information about the products that he has in the stock. A product has its unique id, name, brand name, type (for example food, cosmetic, electronic, etc.), quantity, and price of each unit. **First,** you have to design a **structure** with an appropriate entry according to the problem specification. You should have come up with something like this:

```
Struct product
      {
            Private:
                  int id;
                  string name;
            ........
      };
```

   a. Now create an array of the structure and let the user decide how many products info he/she wants to store. Then store the information using the created array. After that display the name of the products and their prices whose prices are greater than 40.
   b. Repeat the process of (a) using dynamic memory allocation.

2. Consider the problem of the previous question and solve the following using dynamic memory allocation:
   a. User will input the brand name and you have to display every product info of that particular brand.
   b. User will input the type of product and you have to calculate the total asset of that particular type. `(qty*price)`
   c. Calculate the total asset of the grocery shop.

3. Consider a structure having two numbers `range1` and `range2`. `range1` must be smaller than `range2`. The structure also has a `counter` variable and an integer type array `num`. You have to design a program that will generate all the prime numbers in the range of `range1` to `range2` and store them in the array of this structure. You also have to calculate the number of prime numbers in the given range and store that in the `counter` variable of the structure.
   After creating and preparing the structure according to the above-mentioned criterion, you have to print that structure with appropriate messages. You have to print all the prime numbers in that range using a pointer (direct array print is not allowed). Use dynamic memory allocation.

B. Self-referencing Structure

- Think about a structure that points to another structure of the same type. Is that possible? How? Look at the following class:

```
Struct node
{
      int data;
      node *next;
};
```