Exercise 1

```
#include <iostream>
#include <string.h>
using namespace std;

int main()
{
   int cards[4]{};
   int price[] = {2.8,3.7,5,9,-1};
   char direction[4] {'L',82,'U',68};
   char title[] = "ChartGPT is an awesome tool.";

   cout << "sizeof(cards) = " << sizeof(cards) << ",sizeof of cards[0] = " << sizeof(cards[0]) << endl;
   cout << "sizeof(price) = " << sizeof(price) << ",sizeof of price[0] = " << sizeof(price[1]) << endl;
   cout << "sizeof(direction) = " << sizeof(direction) << ",length of direction = " << strlen(direction) << endl;
   cout << "sizeof(title) = " << sizeof(title) << ",length of title = " << strlen(title) << endl;

   //Print the address of each array variable.
   …….

   return 0;
}
```

First, complete the code, then run the program and explain the result to SA. If it has bugs, fix them.

Exercise 2

```
#include <stdio.h>

union data
{
   int n;
   char ch;
   short m;
};

int main()
{
   union data a;
   printf("%lu, %lu\n", sizeof(a), sizeof(union data) );
   a.n = 0x40;
   printf("%X, %c, %hX\n", a.n, a.ch, a.m);
   a.ch = '9';
   printf("%X, %c, %hX\n", a.n, a.ch, a.m);
   a.m = 0x2059;
   printf("%X, %c, %hX\n", a.n, a.ch, a.m);
   a.n = 0x3E25AD54;
   printf("%X, %c, %hX\n", a.n, a.ch, a.m);

   return 0;
}
```

Run the program and explain the result to SA.

Exercise 3

The **CandyBar** structure contains three members: name(character array), weight(float) and the number of calories(integer). Write a program that creates an array of **three CandyBar** structures, initializes them to value of your input, and then displays the contents of each structure. Find the greatest calories per weight, display the name and calories per weight of which satisfies the condition.

```
struct CandyBar
{
    char name[20];
    float weight;
    int calories;

};
```

Sample output:

```
Please input three CandyBars' information:
Enter brand name of a Candybar: Ferro Rocher
Enter weight of the Candybar: 23.6
Enter calories (an integer value) in the Candybar: 893
Enter brand name of a Candybar: Hershey's
Enter weight of the Candybar: 13.2
Enter calories (an integer value) in the Candybar: 658
Enter brand name of a Candybar: Mars Wrigley
Enter weight of the Candybar: 3.2
Enter calories (an integer value) in the Candybar: 127
-------------------------------------------------
Display the CandyBar array contents
Brand name: Ferro Rocher
Weight: 23.6
Calories: 893
Brand name: Hershey's
Weight: 13.2
Calories: 658
Brand name: Mars Wrigley
Weight: 3.2
Calories: 127
-------------------------------------------------
The greatest calories per weight is:
Brand name: Hershey's
Calories per weight: 49.8485
```