HOA

QUESTION 1

Arrays are commonly used to store a collection of relation data values. Once the values are stored, you can perform simple statistical computations. Given the below equations, write a program that prints a table of differences (see sample output).

$$sum = x[0] + x[1] + \cdots + x[6] + x[7] = \sum_{i=0}^{MAX\_ITEM - 1} x[i]$$

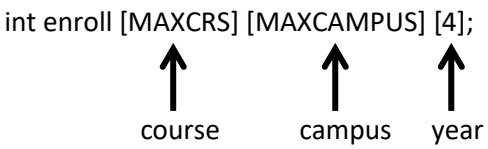
$$sum\_sqr = x[0]^2 + x[1]^2 + \cdots + x[6]^2 + x[7]^2 = \sum_{i=0}^{MAX\_ITEM - 1} x[i]^2$$

$$standard\ deviation = \sqrt{\frac{\sum_{i=0}^{MAX\_ITEM-1} x[i]^2}{MAX\_ITEM} - mean^2}$$

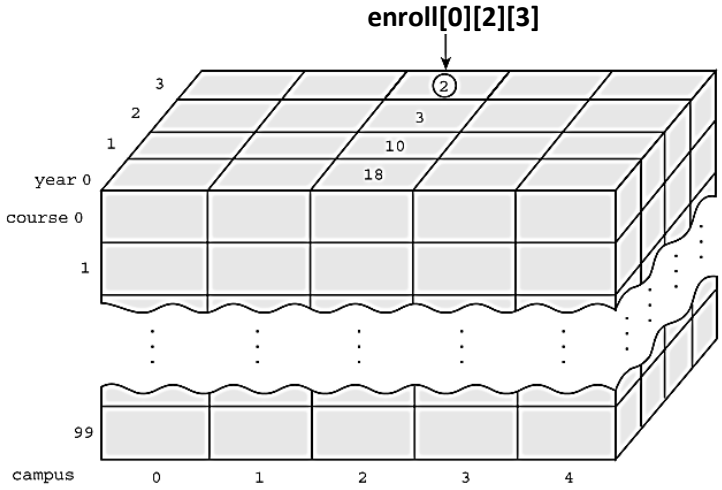
```
Enter 8 numbers separated by blanks or <return>s
> 16 12 6 8 2.5 12 14 -54.5
The mean is 2.00.
The standard deviation is 21.75.

Table of differences between data values and mean
Index       Item      Difference
  0        16.00          14.00
  1        12.00          10.00
  2         6.00           4.00
  3         8.00           6.00
  4         2.50           0.50
  5        12.00          10.00
  6        14.00          12.00
  7       -54.50         -56.50
```

QUESTION 2

Assume that you have a three dimensional array ***enroll*** which keeps the number of offered courses, number of campuses and number of class years (freshman:0, sophomore:1, junior:2, senior:3) in a university as below:



For instance, enroll[0][2][3] gives you the number of seniors taking course 0 at campus 2 (see below image).



Given the following main function and sample output, write the missing functions.

```
#include <stdio.h>
#define MAXCRS 3
#define MAXCAMPUS 2

void enrollStudents(int arr[MAXCRS][MAXCAMPUS][4]);
void displayNoStudentsInEachCourse(const int arr[MAXCRS][MAXCAMPUS][4]);
void displayNoStudentsInEachCampus(const int arr[MAXCRS][MAXCAMPUS][4]);
int find_students(int arr[MAXCRS][MAXCAMPUS][4], int rank, int course);

int main(void)
{
    int enroll [MAXCRS] [MAXCAMPUS] [4];

    enrollStudents(enroll);
    displayNoStudentsInEachCourse(enroll);
    displayNoStudentsInEachCampus(enroll);

    return 0;
}
```

*find_students function finds the number of students of the given rank who are enrolled in the given course on all campuses.

```
Processing course number 0:
 Campus 0
 Enter number of Freshmen > 33
 Enter number of Sophomores > 45
 Enter number of Juniors > 23
 Enter number of Seniors > 12
 Campus 1
 Enter number of Freshmen > 11
 Enter number of Sophomores > 55
 Enter number of Juniors > 44
 Enter number of Seniors > 67
Processing course number 1:
 Campus 0
 Enter number of Freshmen > 23
 Enter number of Sophomores > 24
 Enter number of Juniors > 1
 Enter number of Seniors > 1
 Campus 1
 Enter number of Freshmen > 11
 Enter number of Sophomores > 21
 Enter number of Juniors > 2
 Enter number of Seniors > 0
Processing course number 2:
 Campus 0
 Enter number of Freshmen > 10
 Enter number of Sophomores > 8
 Enter number of Juniors > 0
 Enter number of Seniors > 0
 Campus 1
 Enter number of Freshmen > 12
 Enter number of Sophomores > 13
 Enter number of Juniors > 2
 Enter number of Seniors > 2
Number of students in course 0 is 290
Number of students in course 1 is 83
Number of students in course 2 is 47
Number of students in campus 0 is 180
Number of students in campus 1 is 240
```