CS 256 List of problems

Problem 0.1 *Write a function that takes two strings (arrays of character) A, B and if A and B are the same output yes otherwise no.*

Question 0.2 *What is the output of the following code ? // do not type and try to guess the answer.*

> *int A[4][3]={{1, −1, 2}, {3, 4, −5}, {1, −1, 10}, {2, 3, −7}} ;*
>
> *int ∗P[3];*
>
> *int i,j;*
>
> *for (i=0; i < 3; i++)*
>
> > *P[i]=A[i];*
>
> *for (i=0; i < 3; i++)*
>
> > *A[i][0]=∗(P[i]+2);*
>
> *for (i=0; i < 4; i++)*
>
> > *printf("%d%c",A[i][0],',');*

Question 0.3 *What is the output of the following code ?*

> *int n=20;*
>
> *int A[2][n];*
>
> *int ∗P[5];*
>
> *int i,j;*
>
> *for (j=0; j < 2; j++)*
>
> > *for (i=0; i < n; i++)*
> >
> > > *A[j][i]=(i+j)/2;*
>
> *for (i=0; i < n; i++)*
>
> > *if (! (i %4))*
> >
> > > *P[i/4]=A[0][i];*

```
for (i=0; i < 5; i++)
    printf("%d%c", *P[i],',');
```

Question 0.4 *Write a code to read an integer number n and then read n integer numbers and print out the third largest number of these numbers.*

Question 0.5 *What is the output of this function for $n = 4, i = 5$; // don't type the code and guess the answer.*

```
int function (int n, int i)
{
if ( i== 0) return 1;
if ( n==0 ) return 1;
if ( i % 2 )
return 2*function(n-1, i/2);
else return function(n/2,i);
}
```

Problem 0.6 *Write a code that prints out all the subset of size $m = 3$ from set $\{1, 2, 3, \ldots, n-1, n\}$ for a given number n.*

For example the subset of size 3 from set $\{1, 2, 3, 4, 5\}$ are :

$$\{1, 2, 3\}, \{1, 2, 4\}, \{1, 2, 5\}, \{1, 3, 4\}, \{1, 3, 5\}, \{1, 4, 5\}, \{2, 3, 4\}, \{2, 3, 5\}, \{2, 4, 5\}, \{3, 4, 5\}.$$

Solve the problem for arbitrary $1 < m \leq n$.

Problem 0.7 *Read n points in the plane (2D plane) and find the closet pair of points (the input is n lines of x, y*

Problem 0.8 *Write a program that takes two strings (arrays of character) A, B and if A is a substring of B (A is a sub string of B) then the program returns 1 otherwise 0.*

(e.g. If $A = $ "abade" and $B = $ "cdabadefjde" then the answer is yes).

Problem 0.9 *Write a program that takes two strings (arrays of character) A, B and if A appears in B (A is a subsequence of B) then the function returns 1 otherwise 0.*

(e.g. If $A = $ "abade" and $B = $ "cdaebcdafjde" then the answer is yes).

Problem 0.10 *Write a program to read an array of numbers (say n numbers and n should be read as an input) each of them between 1 and 20 and sort them in no-increasing order.*

Problem 0.11 *Write a code (pseudo code) to read an integer number n and then call a function Sum (n) to print out a_n. Here a_n is an integer where $a_n = a_{n-1} + a_{n-2}$ and $a_0 = 0$ and $a_1 = 1$. (e.g. $a_2 = a_0 + a_1 = 0 + 1 = 1$, $a_3 = a_2 + a_1 = 2$, and $a_4 = a_3 + a_2 = 3$, $a_5 = 5$)*
The output of your program :
for n=0 is 0
for n=1 is 1
for n=2 is 1
for n=3 is 2
for n=4 is 3
for n=5 is 5
for n=6 is 8

Problem 0.12 *Write a code that decides whether a particular element x is in a sorted (descending order) array A of n integer. Your code should be fast and take advantage of the fact that A is sorted.*

Problem 0.13 *Write a program that takes two sorted array A,B of size m, n respectivly and merge these two arrays into a sorted array C.*

For example if A=[1, 4, 5, 7, 8] and B=[2,4,6,8,9,10] then C=[1,2,4,4,5,6,7,8,8,9,10].

Problem 0.14 *Open a text file and count how many times word "system" appears. Print out the result.*

Question 0.15   *1. Open a text file and add string "This is the end of the file" at the end of the file.*

  2. Open a text file and count the number of words in the file. Assume space separate the word. (example: "hello world from cs 256", output would be 5).

Problem 0.16 *Write a program that reads from file graph.txt and compute the number of edges of the graph. In the first line of graph.txt there is an integer number that shows the number of nodes in the graph. Then there are n lines after that. Line number i has n elements each of them '0' or '1'. If the j-th element is 1 then it means i and j are adjacent.*

For example :
5
0 1 1 0 1
1 0 1 1 0
1 1 0 0 1
0 1 0 0 1
1 0 1 1 0

Your output should be 7.

Question 0.17 *Write a code that reads file "example.txt" and exchaneg the first line and the last line.*