Assignment 5

Arrays

1. Take as input N, the size of array. Take N more inputs and store them into the array. Write a function which returns the maximum value in the array. Print the value returned.

2. Take as input a number M. Write a function which returns the index on which M is found in the array, in case M is not found -1 is returned. Print the value returned.

3. Take as input a number M. Write a function which returns the index on which M is found in the array, in case M is not found -1 is returned. Print the value returned. You can assume that the array is **sorted**, but you have to optimize the finding process. For an array of size 1024, you can make 10 comparisons at maximum.

4. Write a function that **reverses** the array. Use a separate “swap” function. Print the values in reversed array.

5. Write a function that **sorts** the array. Print the elements of the sorted array. Use:
   (i) Bubble sort
   (ii) Selection sort
   (iii) Insertion sort

6. For a given list representing the values of a particular Stock at regular intervals of time, find the maximum profit you can make if you can buy only once and sell only once.

7. Write a function which returns the **intersection** of two arrays. Print the list returned.
   (i) Duplicates not allowed in an array
   (ii) Duplicates allowed. Ex: for [1, 2, 3, 1, 2, 4, 1] and [2, 1, 3, 1, 5, 2, 2] the output will be [1, 1, 2, 2, 3]

HINT: Sorting can improve the time complexity.

8. Take as input a “target” number. Write a function which prints all **pairs** of numbers in a list that sum to the given target. E.g. For [3, 1, 9, 7, 5, -1] and target of 8 the output is -1 and 9, 1 and 7, 3 and 5. O(n log n) time

HINT: Sorting can improve the time complexity.

9. Take as input “target”, a number. Write a function which prints all **triplets** of numbers which sum to target. O(n^2) time.

E.g. For [3, 1, 9, 7, 5, -1] and target 9, the output is (-1, 1, 9), (-1, 3, 7), (1, 3, 5).

10. Write a function that returns the sum of two arrays, similar to the sum of 2 numbers.
E.g.

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     [1, 0, 2, 9]
+ [3, 4, 5, 6, 7]
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  [3, 5, 5, 9, 6]
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11. Take as input N, the size of the array. Take N more inputs (1 through N) and store that in an array. Write a function that returns the **inverse** of this array. Print the values in inverted array.
Definition of inverse:
Inverse of 54123 is 34521.
In 54123, “5” is at 1st place, therefore in 34521, “1” is at 5th place.
In 54123, “4” is at 2nd place, therefore in 34521, “2” is at 4th place.

12. Write a function that returns true if an array is **mirror-inverse** and false otherwise.
A number is called **mirror-inverse** if its **inverse** is equal to itself. **Make sure you call the function from the previous question in order to find the inverse in this function.**