Lab 3: Pointer

Complete the following given functions

1. Swap 2 given integers.

   ```
   void swap(int* a, int* b)
   ```

2. Calculate the total value of 2 integers.

   ```
   int* sum(int* a, int* b)
   ```

3. Input an array with unknown size.

   ```
   void inputArray(int* a, int &n)
   ```

4. Print a given array

   ```
   void printArray(int* a, int n)
   ```

5. Find the largest value from a given array.

   ```
   int* findMax(int* arr, int n)
   ```

6. Duplicate a given array.

   ```
   int* copyArray(int* arr, int n)
   ```

7. Count even numbers from a given subarray. Generate a subarray with all even numbers from the given array.

   ```
   int* countEvens(int* arr, int n, int* evens)
   ```

   ```
   int* genEvenSubarray(int* arr, int n, int* count)
   ```

8. Find the subarray with largest total value from a given array.

   ```
   int* findLargestTotalSubarray(int* a, int n, int &total, int &length)
   ```

9. Find the longest ascending subarray from a given array.

   ```
   int* findLongestAscendingSubarray(int* a, int n, int &length)
   ```

10. Swap 2 given arrays.

    ```
    void swapArrays(int* a, int* b, int &na, int &nb)
    ```

11. Concatenate 2 given array.

```
int* concatenate2Arrays(int* a, int* b, int na, int nb)
```

12. Given 2 ascending array with distinguish elements. Generate a new ascending array with all elements from the given array.

```
int* merge2Arrays(int* a, int* b, int na, int nb, int&nc)
```

13. Generate a random matrix with keyboard input size.

```
void generateMatrix1(int** A, int &length, int &width)
```

14. Given 2 1D arrays `a` and `b`. Generate the matrix `c` that c[i][j] = a[i] * b[j].

```
int** generateMatrix2(int* a, int* b, int na, int nb)
```

15. Swap 2 columns / rows of a given matrix.

```
void swapRows(int** a, int length, int width)
```

```
void swapColumns(int** a, int length, int width)
```

16. Generate the transpose matrix of a given matrix.

```
int** transposeMatrix(int** a, int length, int width)
```

17. Concatenate 2 given size-equal matrices , horizontally / vertically.

```
int** concatenate2MatricesH(int** a, int** b, int length, int width)
```

```
int** concatenate2MatricesV(int** a, int** b, int length, int width)
```

18. Multiple 2 given matrices.

```
bool multiple2Matrices(int** a, int** b, int lengtha, int widtha, int lengthb, int widthb)
```

19. Given matrice a. Find the submatrix of a which satisfy keyboard input size and has the largest total value of its elements.

```
int** findSubmatrix(int** a, int length, int width, int &length_, int &width_)
```