Pick 2 out of 3 problems. Submit only 2 problems or the last problem will not be graded. Submit one PDF file with code and input/output. It is your responsibility to confirm that you submitted your file correctly, so it is best to view your submission to make sure it was submitted correctly.

1. Given an input string, process it (ignore case) and display the three most frequently used words (words and counts in descending order). There is a requirement that the run time must be O(n) where n is the number of words. *Hint: input each word and store it and the count in a hash map*. Try the following test case:

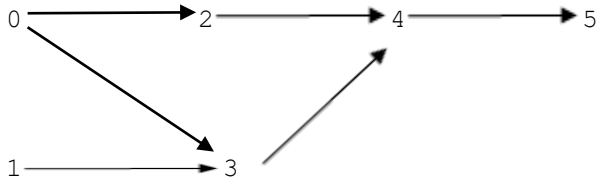
   Input: This is a test and this is another test test test test it is
   Output:

test	4
is	3
this	2

2. Given **four sorted arrays/vectors** of names (strings) with lengths k, l, m, and n, provide the code to perform a **four-way merge** to merge them into one sorted array/vector in O(k + l + m + n). Test your code with the following test cases.

   - Array 1 – "Adam", "Kim", "William"
   - Array 2 – "Bob", "Jane", "John", "Tim"
   - Array 3 – "Bill", "Joann"
   - Array 4 – "Candace", "Daniel", "Eric", "Michelle", "Tanya"

3. Given the following DAG, provide a simple matrix to represent it (each entry of the matrix would hold a value 0 or 1).



   Provide code to print the above DAG using the following format (there are two edges from 0 to 2 and 0 to 3, …, and no edge from 5).

```
Vertex   Edges
0        2 3
…
5
```

   Print one possible topological ordering for the above DAG such as:

```
0 2 1 3 4 5
```