Mid-Semester Test
(EC-2 Regular)

Course No.   :
Course Title   : Software Architectures
Nature of Exam   : Open Book
Weightage   : 35%
Duration   : 2 Hours
Date of Exam   : 24/09/2021 or 08/10/2021 (FN/AN)

No. of Pages   = 1
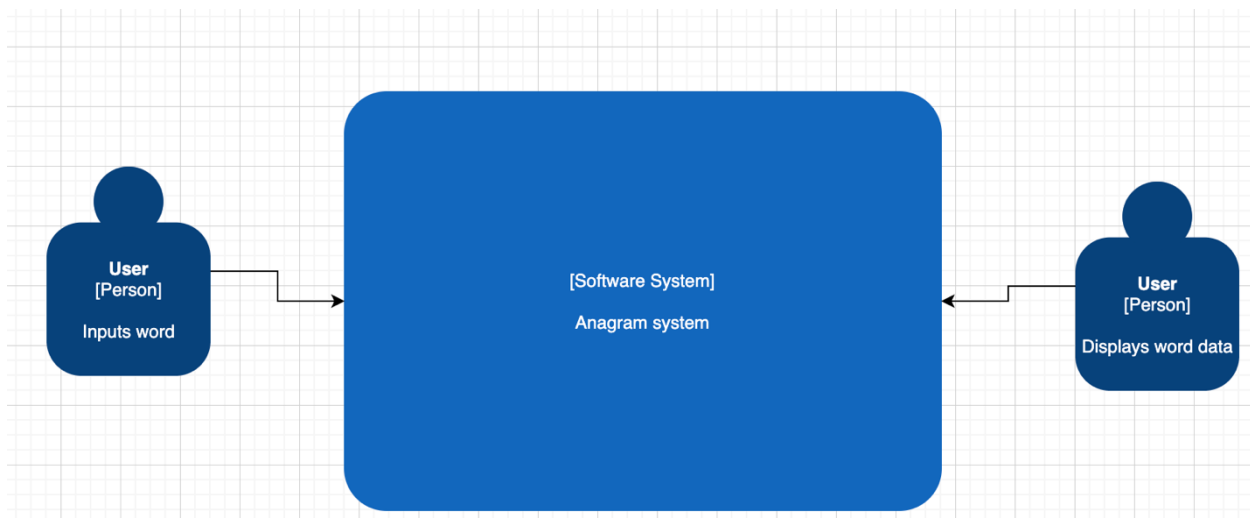No. of Questions = 5

Note to Students:
1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.1 Set. (A)   Marks **4**

Build a console application that accepts a word as input from the user. The word is passed on to a service[X] that generates an anagram and returns the result. Service X also posts the word and the anagram as a message to a Message Queue. Another Service Y (subscriber of the queue) reads the message from the queue and writes it to a database. You will build another console application that just displays all the data from the database.
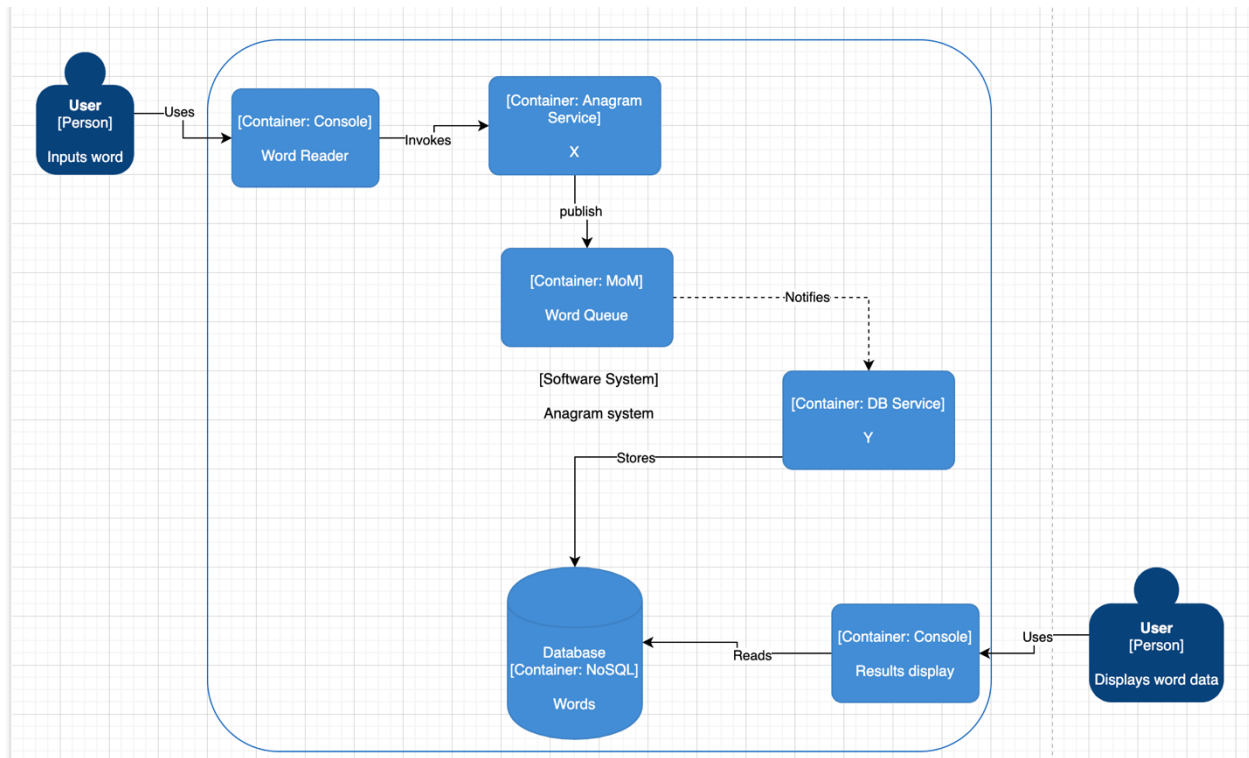
Draw a C4 context diagram for the above problem

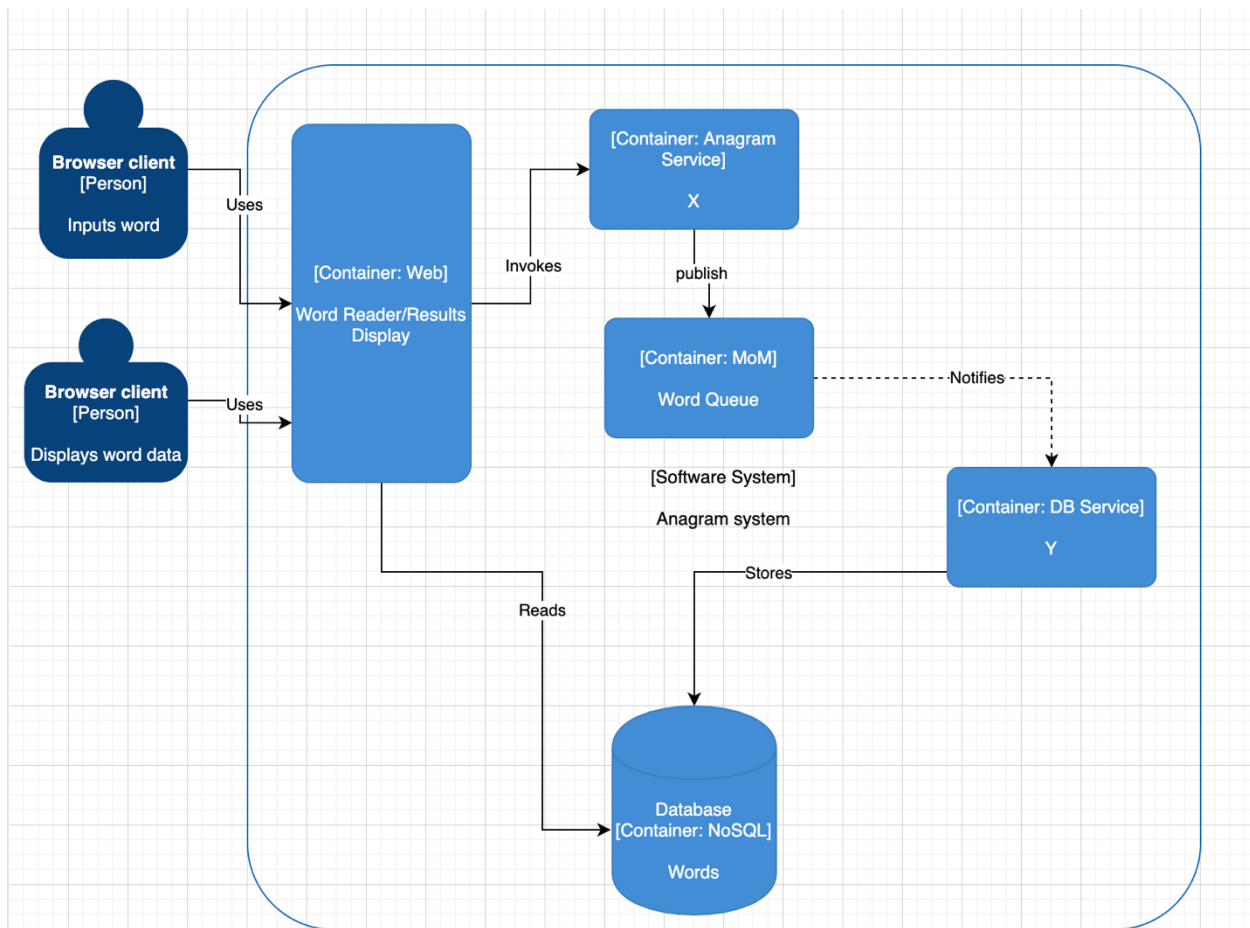Q.2 Set. (A)   Marks **10**

For the problem statement in (1) draw a C4 container diagram showing all the containers in the system.

Q.3 Set. (A)   Marks **8**

In the problem statement in (1) replace the word "*Console*" with "*Web*" in the above problem and show the changes in the container diagram.

Q.4 Set. (A)   Marks **8**

In the problem statement in (1) show the layers with their responsibilities for the service [X]

Anagram service
Presentation Layer: Receives word as input from the application
Business layer: Logic to compute the anagram
Service layer: Connect to the Message Queue and post the word and anagram
Persistence layer: NA
Database/Data source layer: NA

Q.5 Set. (A)   Marks **5**

You want to build a data pipeline that takes all the words from the database and write to files. As soon as the words get written to the database, you want to take the delta(changes) and write to the files. We plan to have a file for each word. The file will contain the anagrams. You have decided to use a serverless architecture for this purpose. Draw a container diagram showing the data pipeline from database to file system.

Database
[Container: NoSQL]

Words

Change
trigger
invokes

[Software System]

Anagram system

Words-Anagram
[Container: Blob Storage or
AWS S3 or Cloud storage]

File Storage

Word-to-File
[Container: AWS or
Azure or GCP]

Serverless function

writes