1. a) Explain how digital transformation can bring revolution in healthcare industry.

Digital transformation can profoundly revolutionize the healthcare industry by fundamentally changing how care is delivered, managed, and experienced. Ways in which digital transformation can bring about this revolution**:**

1. Enhanced Patient Experience

- Telemedicine: Provides remote access to healthcare services, allowing patients to consult with doctors from their homes. This improves accessibility for people in remote areas and reduces waiting times.

2. Improved Diagnostics and Treatment

- Artificial Intelligence (AI): AI-powered tools assist in interpreting medical images, predicting patient outcomes, and personalizing treatment plans. For example, AI algorithms can detect early signs of diseases such as cancer from imaging data with high accuracy.

3. Operational Efficiency

- Electronic Health Records (EHRs): Digital records streamline the management of patient information, enhancing coordination among healthcare providers and reducing errors associated with manual record-keeping.

4. Data-Driven Decision Making

- Big Data Analytics: Analyzes large volumes of data to uncover trends, predict health outcomes, and support evidence-based decision-making. This can lead to better disease prevention strategies and more effective treatments.

5. Enhanced Patient Engagement

- Wearable Technology: Devices like smartwatches and fitness trackers collect real-time health data, allowing for continuous monitoring of chronic conditions and providing valuable insights to both patients and healthcare providers.

6. Cost Reduction

- Remote Monitoring: Reduces the need for in-person visits, which can lower costs for both patients and healthcare systems. It also enables timely interventions that can prevent costly emergencies.

7. Better Access to Care

- Global Health Initiatives: Digital platforms facilitate collaboration and knowledge sharing across borders, improving the ability to tackle global health challenges and expand access to care in underserved areas.

8. Enhanced Security and Compliance

- Cybersecurity: Advances in digital security ensure that patient data is protected from breaches and unauthorized access, maintaining confidentiality and compliance with regulations.

9. Faster Innovation and Research

- Clinical Trials: Digital platforms accelerate the recruitment process and data collection for clinical trials, leading to faster development of new treatments and therapies.

1 b) Define Enterprise. Explain the steps involved in the organizing an enterprise.

An enterprise is a project, a willingness to take on a new project, an undertaking or business venture. An example of an enterprise is a new start-up business or someone taking initiative to start a business.

Organizing the Enterprise process –

1. Determining Activities

❖ The first step in organizing is to identify and enumerate (to specify one after another) the activities required to achieve the objectives of the enterprise.

❖ The activities will depend upon the nature and size of the enterprise.

2. Grouping of Activities

❖ The various activities are then classified into appropriate departments and divisions on the basis of functions, products, territories, customers etc.

❖ Similar and related activities may be grouped together under one department or division.

3. Assigning Duties

❖ The individual groups of activities are then allotted to different individuals on the basis of their ability and aptitude.

❖ The responsibility of every individual should be defined clearly to avoid duplication of work and overlapping of effort.

4. Delegating Authority

❖ Every individual is given the authority necessary to perform the assigned task effectively.

❖ An individual cannot perform his job without the necessary authority or power.

5. Coordinating Activities

❖ The activities and efforts of different individuals are then synchronized. Such co-ordination is necessary to ensure effective performance of specialized functions.

4a. Zomato is an online food ordering application that helps its users to buy variety of food items. This application allows users to log in for ordering food. Users can search for their favourite food based on rating or price. Uses can select the food items and add to cart. Once the food selection is finalized, user can pay online through online payment methods and order/cancel their food. Users will be notified about the order details & delivery of food. Identify and write the user stories for this application.

For Zomato application, the user stories are as follows-

1. User Story: Registration/Sign-up:

As a new user I want to sign up for the application through a sign-up form, so that I can access the Zomato app.

Acceptance Criteria:

- While signing up, enter Username, Email, Password & Confirm Password, Security question and Address.
- If user sign up with an incorrect detail, user receives an error message for incorrect information.
- If sign up is successful, a confirmation email is sent to user for mobile & email verification. After successful verification user can login into app with credentials

2. User Story: Login

As a registered/authorized user, he/she wants to login into zomato application so that user can search and order food provided by various restaurants listed in the app.

Acceptance Criteria:

- Username, password and captcha are required for user login.
- If we are trying to login with incorrect username or password, then error message will be displayed as "invalid credentials”.
- After successful log in, home page is displayed.

3. User Story: Search

As an authorized user, he/she wants to search the variety of food so that user can order the food of his/her choice.

Acceptance Criteria:

- User has to enter valid food name.
- A valid search displays list of restaurants with food available
- User can sort, filter and modify the search results based on the rating or price.

4. User Story: Food Ordering

As an authorized user, he/she wants to order a food of his/her choice from the list of available foods

Acceptance Criteria:

- User has to choose among the available food/s for booking.
- Valid payment mode is to be selected for making necessary payment
- After successful payment, user should get the order details to registered mobile number and E-mail id

5. User Stories: Logout

As a logged in user, he/she wants to log out of zomato app which prevents unauthorized access to user profile.

Acceptance Criteria:

- When user logs out of his account by clicking log out button, logged out message should appear and app has to redirected to the log-in page.
- If user session expires due to internet failure or system crash, then user has to be logged out the application.

4b) Write the test cases for the above application.

Test Cases for the Registration Page:

i. Verify that the registration page is accessible from the website's homepage and loads correctly for desktop and mobile versions.
ii. Ensure that the system does not allow duplicate email addresses or phone number
iii. Verify that the user receives an email or SMS confirmation after registering.

Test Cases for the Login Page:

i. Verify that the login page loads correctly and is accessible from the website's homepage.
ii. Check that the login credentials are case sensitive and the appropriate message is displayed if the user enters incorrect information.
iii. Verify that the "Forgot Password" option works as intended, allowing users to reset their password in case they forget it.

Test Cases for the Food Search:

i. Ensure that the food search page displays list of restaurants with food.
ii. Verify whether user is able to apply filter, sort food and modify existing search.
iii. Verify whether user is able to select the required food, check for its availability and quantity.

Test Cases for the Food Ordering:

i. Verify that the system displays the total cost of the food as per ordering details, including any taxes, discount and fees.
ii. Verify whether user is able to cancel the food or not.
iii. Verify whether order confirmation is received by user or not.

Test Cases for the Payment Gateway:

i. Verify that the payment gateway is secure & encrypts user information to prevent fraud.
ii. Ensure that the system accepts multiple payment options, such as credit/debit cards, GPay, PhonePe and mobile wallets
iii. Ensure that the payment gateway sends a confirmation email or SMS to the user after the successful transaction

6a) Differentiate spring and spring boot.

S.No.	Spring	Spring Boot
1.	Spring is an open-source lightweight framework widely used to develop enterprise applications.	Spring Boot is built on top of the conventional spring framework, widely used to develop REST APIs.
2.	The most important feature of the Spring Framework is dependency injection.	The most important feature of the Spring Boot is Autoconfiguration.
3.	It helps to create a loosely coupled application.	It helps to create a stand-alone application.
4.	To run the Spring application, we need to set the server explicitly.	Spring Boot provides embedded servers such as Tomcat and Jetty etc.
5.	To run the Spring application, a deployment descriptor is required.	There is no requirement for a deployment descriptor.
6.	To create a Spring application, the developers write lots of code.	It reduces the lines of code.
7.	It doesn't provide support for the in-memory database.	It provides support for the in-memory database such as H2.
8.	Developers need to write boilerplate code for smaller tasks.	In Spring Boot, there is reduction in boilerplate code.

6b) Implement programmatically navigation between different components using react Router.

- **App.js**

```
import "./App.css";
import { BrowserRouter, Route, Routes } from "react-router-dom";
import Home from "./Home";
import About from "./About";
import Contact from "./Contact";
import Navbar from "./Navbar";
function App() {
return ( <div className="App">
```

- **Navbar.js**

```
import React from "react";

import { Link } from "react-router-dom";

<Link to="/">HOME</Link>

<Link to="/about">ABOUT</Link>

<Link to="/contact">CONTACT</Link>

</nav>

</div>);

}; export default Navbar;
```

- **Home.js**

```
import React from 'react'const Home = () => { return (

<div><h2>Welcome to Home page</h2></div>

 ); };

export default Home;
```

- **About.js**

```
import React from "react";const About = () => { return (

 <div> <h2>This is ABOUT page</h2> </div>

); }; export default About;
```

- **Contact.js**

```
import React from 'react'const Contact = () => { return (

<div><h2>This is CONTACT page</h2></div>

); }; export default Contact;
```

8a. Illustrate ACID transaction in MongoDB

ACID transactions in MongoDB refer to operations that are guaranteed to be Atomic, Consistent, Isolated, and Durable, just like traditional relational databases. Here's how MongoDB ensures these properties in transactions:

1. Atomicity

Atomicity means that a transaction will either complete entirely or have no effect at all. In MongoDB, a transaction is atomic at the document level, and with multi-document transactions, MongoDB ensures that either all operations in the transaction are applied, or none of them are.

2. Consistency

Consistency ensures that a transaction brings the database from one valid state to another valid state. MongoDB ensures consistency through its transaction mechanisms by ensuring that all operations within a transaction are applied together.

3. Isolation

Isolation ensures that concurrent transactions do not interfere with each other. MongoDB achieves isolation in transactions by using a snapshot of the data that is consistent throughout the transaction.

4. Durability

Durability ensures that once a transaction has been committed, it will remain committed, even in the event of a system crash. MongoDB writes transaction logs to ensure that committed data is preserved.After calling `commitTransaction()`, the changes are durable, and in case of a failure, MongoDB will recover to the last committed state.

8b. Demonstrate with a simple code to secure REST APIs with Spring Security.

Spring Security is an application-level security framework which provides various security features like: authentication, authorization to create secure Java Enterprise Applications.

The framework targets two major areas of application are authentication and authorization.

- Authentication is the process of knowing and identifying the user that wants to access.
- Authorization is the process to allow authority to perform actions in the application. The application-level framework features provide Login and logout functionality. It allow/block access to URLs to logged in users. It also allow/block access to URLs to logged in users AND with certain roles.

- pox.xml code for spring security dependency

```
<dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-security</artifactId>
</dependency>
```

- SecurityController.java class

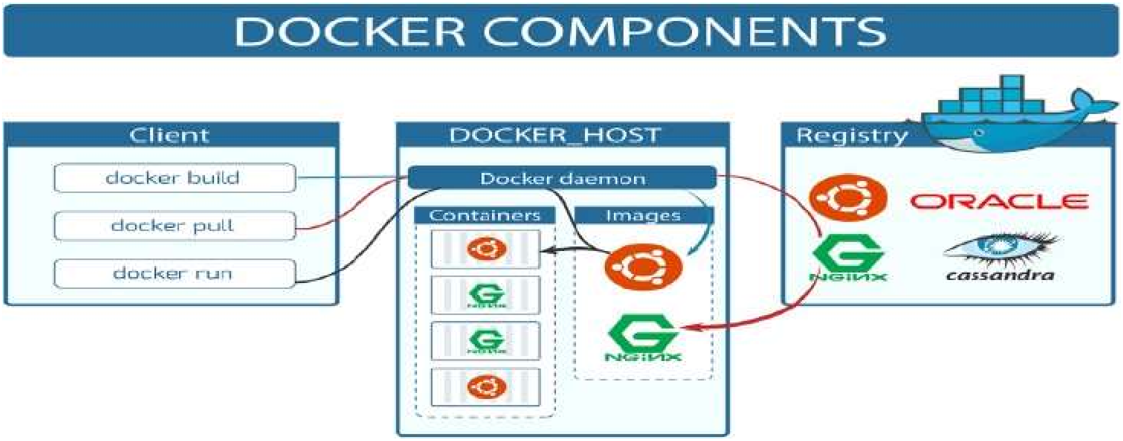
```
        @RestController
        public class SecurityController {
        @GetMapping("/")
        public String Welcome() {
        return ("<h1>Welcome to SpringBoot Security</h1>");
        } }
```

A default system generated security password is given by the spring boot security framework. The password is dynamic and changes every time we execute the application. Try to access the REST API using the URI mapping that is http://localhost:8080/ in any browser or application like postman or swagger.

Application.properties file is created under src/main/resource package. We can also create static user and static password by setting its value in the application.properties file as shown below.

```
        spring.security.user.name=ABC
        spring.security.user.password=XYZ
```

10. a) Discuss the Components of Docker Container.



Docker is an open-source software platform. It is designed to make it easier to create, deploy, and run applications by using containers. Containers allow a developer to package up an application with all of the parts which are required, such as libraries and other dependencies and ship it all out as one package. The Docker Components are

• Docker client

The Docker client enables users to interact with Docker. Docker runs in a client-server architecture that means docker client can connect to the docker host locally or Source Code remotely. Docker client and host (daemon) can run on the same host or can run on different hosts and communicate through sockets or a RESTful API.

• Docker Host

The Docker host provides a complete environment to execute and run applications. It includes Docker daemon, Images, Containers, Networks, and Storage.

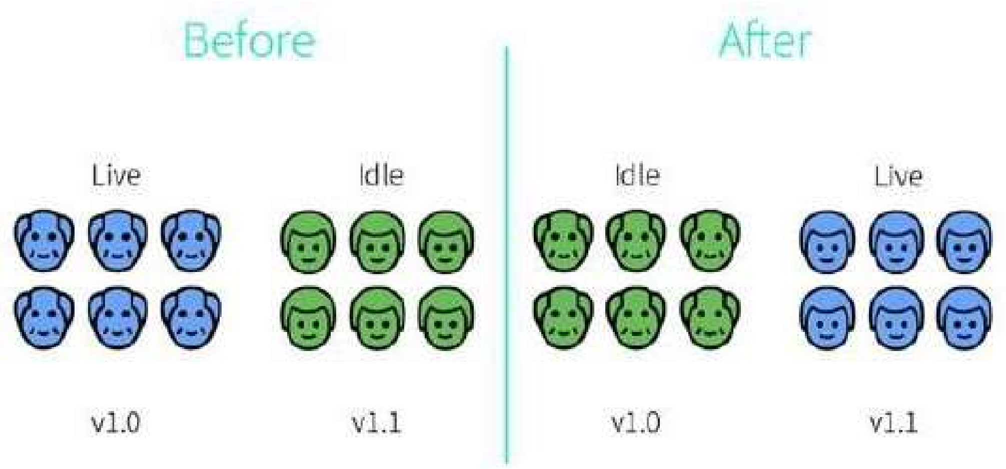
a) Docker Daemon
b) Docker Images
c) Docker Containers
d) Docker Networking
e) Docker Storage

• Docker Registries

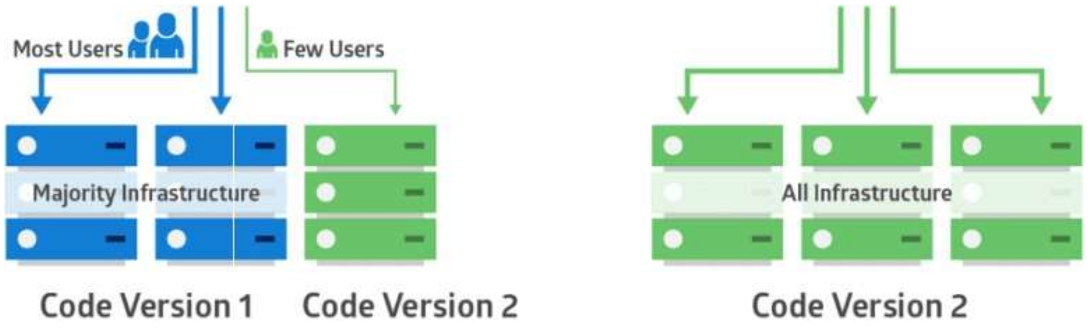
Docker-registries are services that provide locations from where we can store and download images. A Docker registry contains repositories that host one or more Docker Images. Public Registries include Docker Hub and Docker Cloud and private Registries can also be used.

10b. Illustrate the working Blue-Green and Canary deployment strategies with neat diagram.

- **Blue/green deployment** Blue/green deployment is a deployment technique to release new code into the production environment. Blue/green deployments make use of two identical production environments – known as Blue which is active and the other is Green which is set to idle. New updates are pushed to the active environment where it is monitored for bugs while the idle environment serves as a backup where traffic can be routed in case an error occurs.



- **Canary deployment** Canary deployment is a technique to reduce the risk of updating software or introducing new changes in the production environment by slowly rolling out the change to a small subset of users before making the software functional for everyone. This method helps you identify and address any potential issues with the new release before it affects all users, thus minimizing the risk of a widespread problem or outage.


Most Users
Few Users
Majority Infrastructure
Code Version 1
Code Version 2
All Infrastructure
Code Version 2