1) What is GIS? Explain phases and features of GIS.

A GIS (or a CEMS or EIS) is a software system that provides support to the business to implement its environment responsible businessstrategies (ERBS). Thus, this system has to cover the length, breadth, and depth of various structural and dynamic aspects of the business.

Some aspects of this system are similar to any other software system—it has underlying carbon emissions data that is gleaned from the devices that emit that carbon, it has processes and applications that help analyze that data, identify the trends, and, eventually, it has interfaces that present, report, and interact (and collaborate) with other external sources of carbon services and data.

Phases in a GIS Development and Deployment

Figure depicts the major phases of any typical software development lifecycle. In terms of GIS, they apply as follows:

Develop:- GIS needs to be developed by following agile practices and considering the important phases of a SDLC starting from requirements, analysis, design, and code to testing. Development has to consider issues of deployment, integration, and operations.

Analysis and design of the system is undertaken using the unified modeling language (UML) diagrams that helps in modeling the problem space and develop a solution in design space (model of solution space). CAMS provides this overall methodological approach.

Configure:- Configuring GIS according to benchmarks and rules of organization. This would be an activity specific to each organization within each industry sector.

Use:- Use of GIS will lead to ongoing recording of carbon data creation of reports as well as comparisons

The features of a GIS that play a significant role in enhancing this ability of business to coordinate its environmentally responsible approaches can be

listed as follow:

Collecting environment-related data in real time:-The GIS has to be geared to collect data such as number of devices in use and on standby. Mobility further enhances this data capture ability and makes it real time. GIS has to also relate this data to other business applications.

Providing querying tools, key performance indicators (KPIs), and business analytics to field workers and decision makers in the area of EI. Availability of querying mechanisms can provide information that enables closing down of unused servers, desktops, and other equipment.

Enhancing the decision-making capabilities of senior management by collating and computing up-to-date information from varied external sources (e.g., government regulatory bodies and weather information) and feeding t hat into GIS. As a result, knowledge management in the green domain of the organization is enhanced. This service-oriented approach in GIS and the resultant real-time analytics

goes a long way in enhancing the organization's green credentials.

2) Explain GIS requirements.

The Green ICT is developed to measure only energy consumption and environmental parameters such as carbon emissions, chemical wastes, and other office and industrial wastes. The Department of Environment, a government agency, is responsible for monitoring the carbon footprint of all the companies. This document will concentrate on process of gathering requirements, the resources needed to build the standards module of the project, and monitoring the progress of the project through a Gantt chart

Green ICT system analysis and design is performed using the UML. UML diagrams such as use case, class, sequence, activity, state machine, package component, and deployment diagram are used in modeling the problem space and in designing of the system.

As mentioned earlier, these diagrams help in modeling the operations and interactions at the business level and also in system design thorough classes, packages, components, and deployment diagrams.

A typical GIS would involve two subsystems:

Green organizational portal (GOP)

Regulatory standards portal (RSP)

Regulatory portal provides the standard emission value determined by the regulatory body for each emission type based on the industry and company.

Organizational portal focuses on the capture of emission data and its comparison with the emission standards.

3) Explain different UML diagram used for modeling a GIS(any 5)

The UML has been used in presenting the models of the GIS. The modeling constructs of the UML that are used in this chapter are as follows:

Package diagrams—Used to create and model subsystems/Green information portals. Packages can also be used to create increments and sprints in an agile development approach.
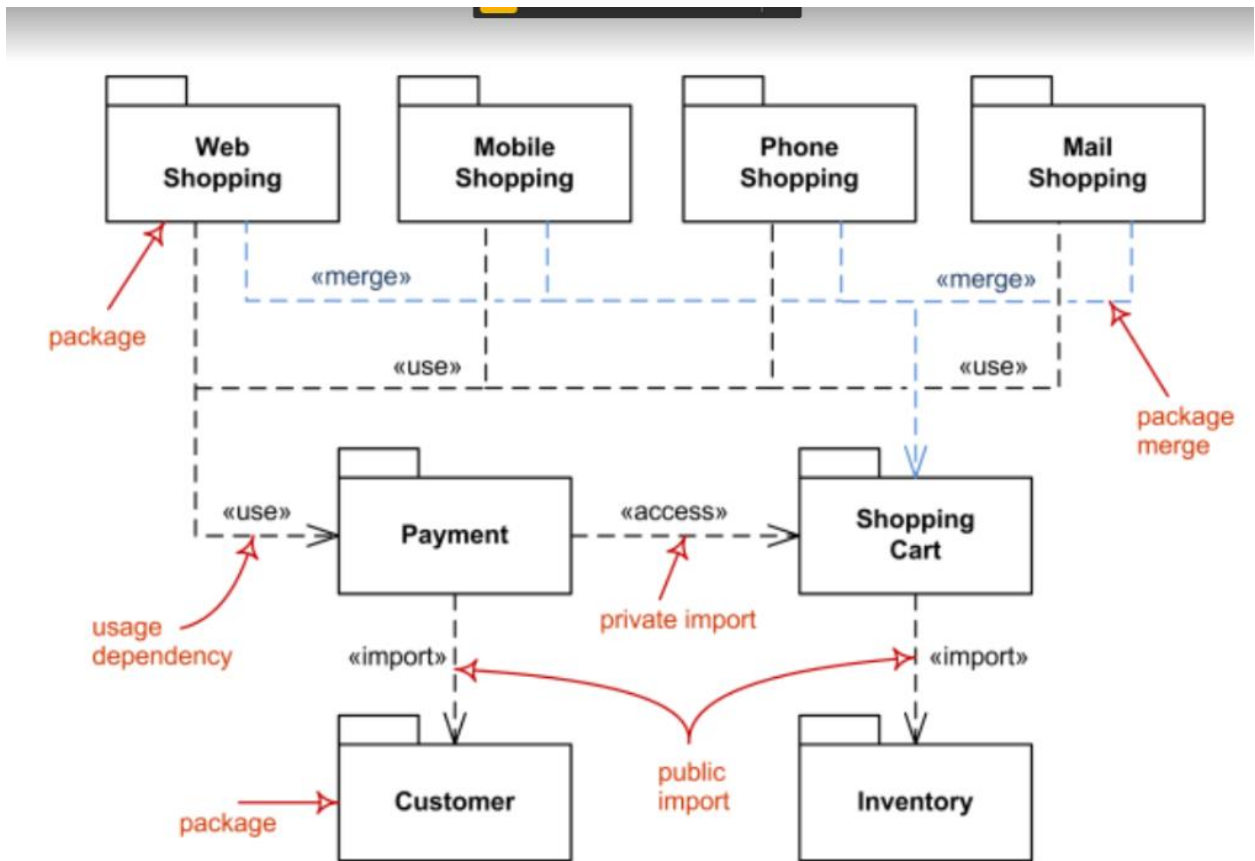

Use cases—Used to show functionalities and business processes from a user's point of view. This is the expected behavior of the system documented as interactions.

Use case diagrams—Provides a model describing all the related business processes/functionalities of a particular package. These diagrams also provide the scope of the
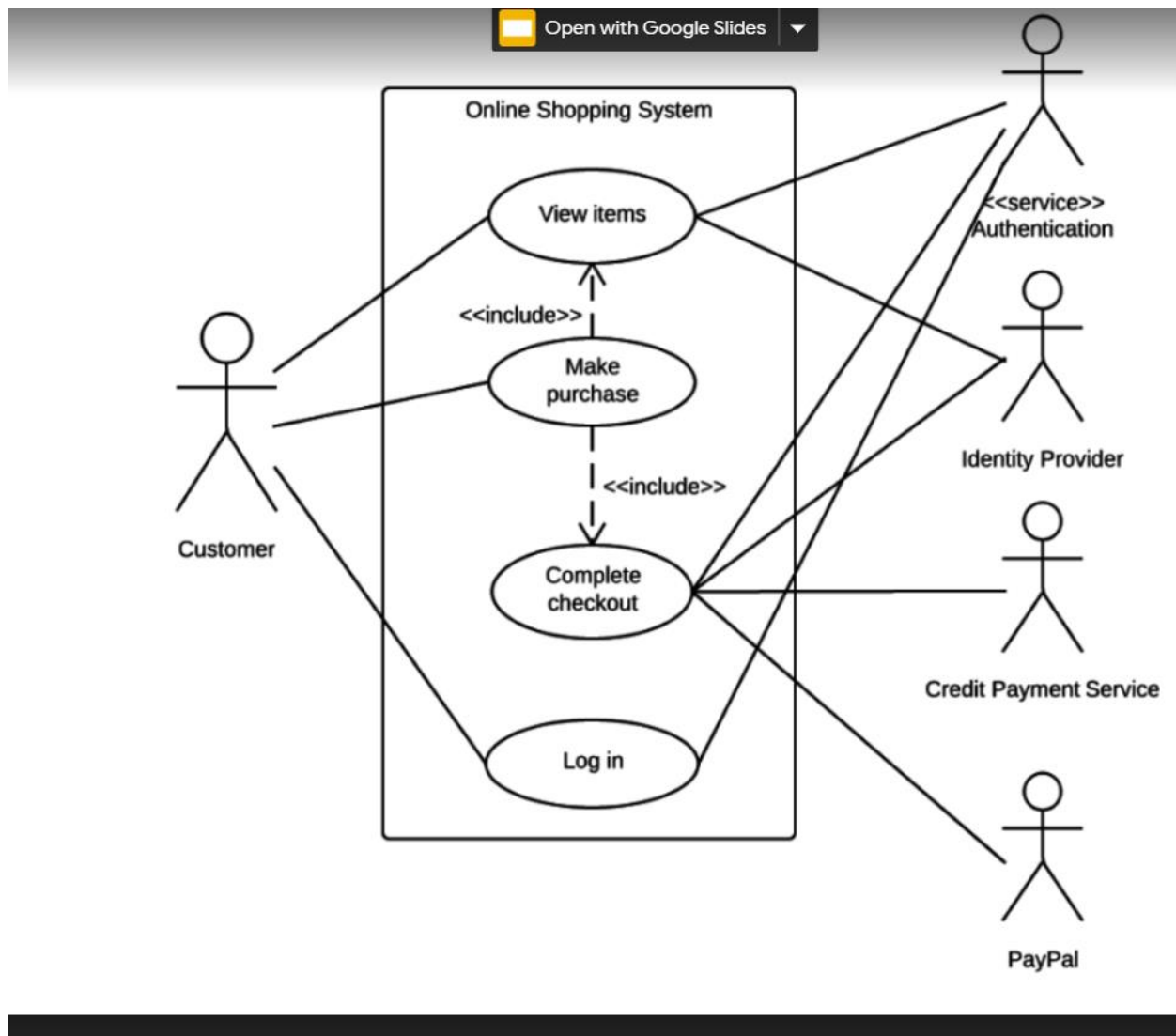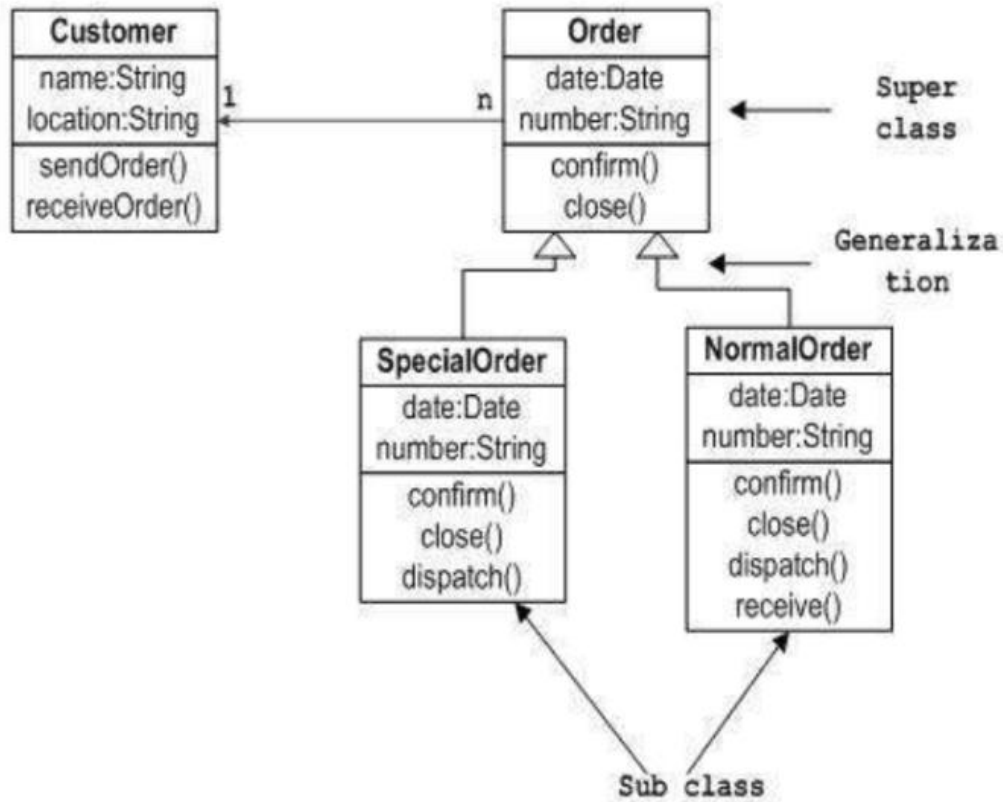

Activity graphs—Provides a detailed view of every step of a business process. They provide the flow within a use case or a package of GIS.
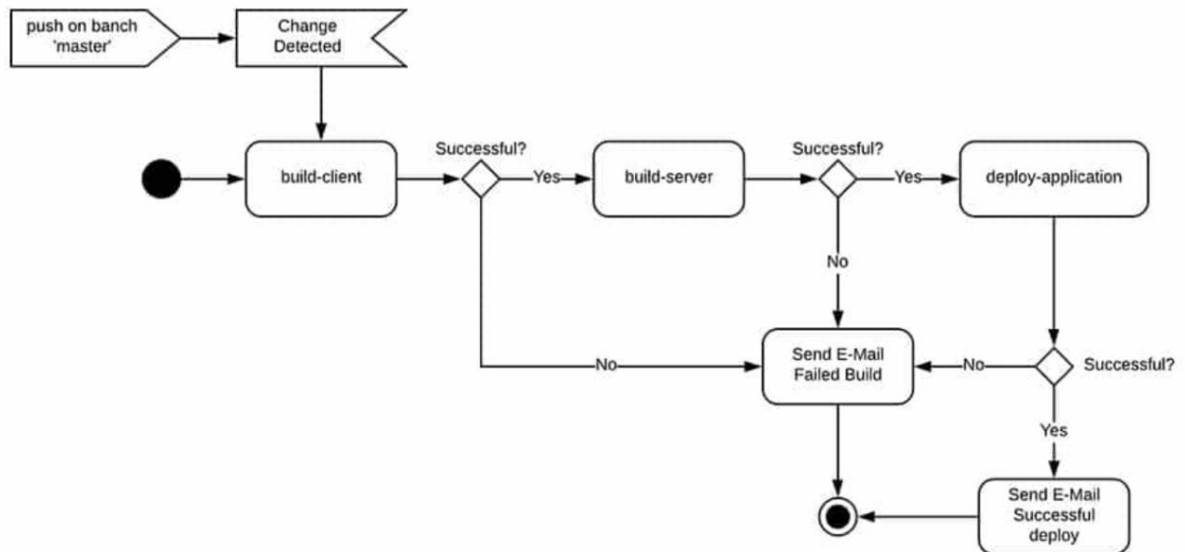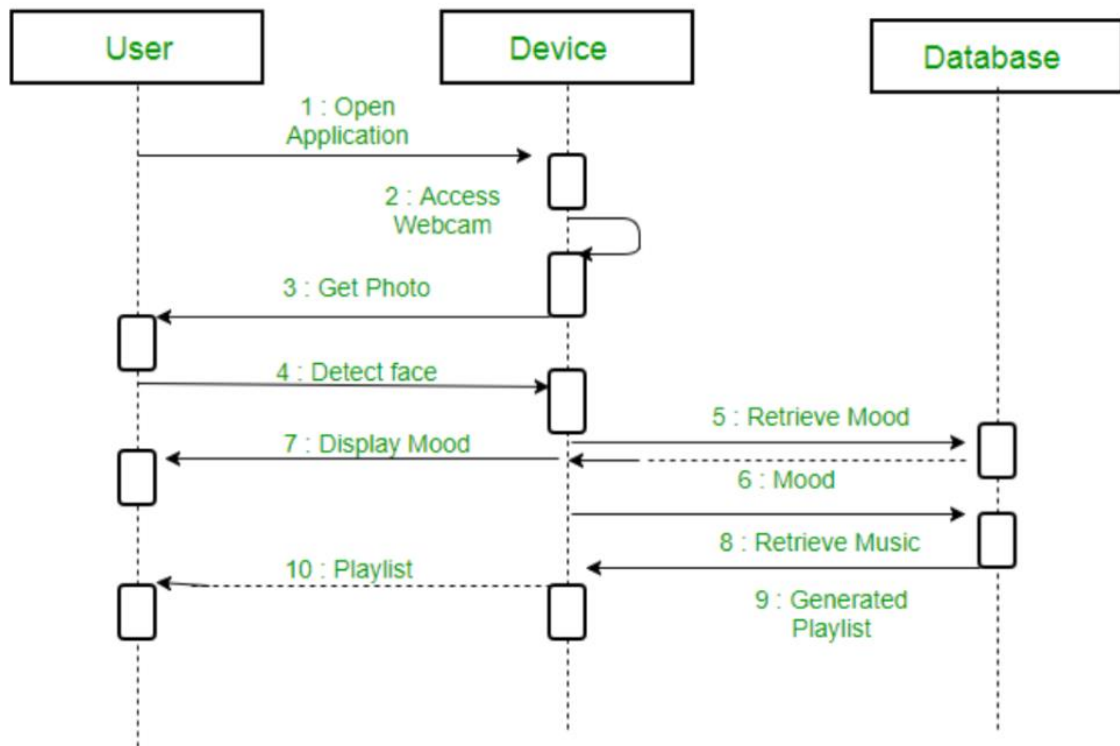
Class diagrams—Provides a static model of GIS based on its key business entities. This diagrams can also be used to model underlying carbon data warehouse.

Sample Class Diagram

Customer
name:String
location:String
sendOrder()
receiveOrder()

1   n

Order
date:Date
number:String
confirm()
close()

← Super class

← Generaliza tion

SpecialOrder
date:Date
number:String
confirm()
close()
dispatch()

NormalOrder
date:Date
number:String
confirm()
close()
dispatch()
receive()

Sub class

Sequence diagrams—Provides a model for the interactions between objects and also rules for these interactions that are architectural decisions

User → **Device** → **Database**

1 : Open Application
2 : Access Webcam
3 : Get Photo
4 : Detect face
5 : Retrieve Mood
7 : Display Mood
6 : Mood
8 : Retrieve Music
10 : Playlist
9 : Generated Playlist

4) Discuss the difference in the speeds of Green IT transformation of a business unit versus the society.

5) Why is Green IT subjective? What can be done to convert the subjective, tacit knowledge of Green IT carried by people in their head to objective, explicit, green knowledge?

6) Describe how the practice of videoconfere++ ncing, telecommuting, and mobile commuting assist in carbon reduction. What challenges are faced by organizations implementing these practices?

7) Discuss the vital role played by Green HR

8) What are the various role-based views of Green IT in an organization? How does the view of a decision maker differ from that of an IT consultant?

9) What is SFIA? How would you map the roles of an environment officer and CGO, to the SFIA level?

10) What are the possible differences in the way the fully developed nations view carbon emissions as compared with the developing nations today?

11) What is a Green IT audit? List and discuss the purpose for conducting such Green IT audits

12) What would be the innovative aspects of applying Cloud computing to the environmental challenge?