
	Akhil Bharatiya Maratha Shikshan Parishad's Anantrao Pawar College of Engineering & Research		
	Record No.: ACA/D/021 Revision: 00	DoI: 02/01/2023	
Internal Correspondence for Department			

B.Voc in Software Development

WINDOWS DEVELOPMENT FUNDAMENTALS

END SEM EXAM NOTES



1. Explain the concept of Web Deployment and its importance in a business context?

Web deployment refers to the process of making a website or web application available on the internet. It involves several steps, including coding, testing, and hosting. In a business context, it's crucial for multiple reasons.

Firstly, it allows businesses to reach a global audience. With an online presence, companies can market their products or services worldwide, increasing potential customer base. Secondly, it provides 24/7 accessibility, enabling customers to access information or make purchases at any time.

Moreover, web deployment facilitates efficient business operations. For instance, internal web applications can streamline processes like project management or HR tasks, enhancing productivity. Additionally, it enables data collection and analysis, providing valuable insights into customer behavior and preferences, which can inform strategic decision-making.

Lastly, in today's digital age, having a well-deployed website is essential for credibility. A professional, user-friendly site can enhance brand image and trustworthiness. Conversely, a poorly deployed site can deter potential customers.

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2. What considerations do you take into account when deploying a web application?

When deploying a web application, several considerations are crucial. The first is the **choice of hosting environment**, which should be reliable and scalable to handle potential traffic spikes. Security measures such as SSL certificates for HTTPS connections and regular security updates are also essential. Performance optimization techniques like minification and compression can improve load times, while continuous integration/continuous deployment (CI/CD) practices ensure smooth updates. It's important to have a rollback strategy in case of failed deployments. Lastly, monitoring tools help track performance and identify issues early.



3. List Some Programming Languages?

- Python (AI and machine learning)
- Javascript (rich interactive web development)
- Java (enterprise application development)
- R (data analysis)
- C/C++ (operating systems and system tools)
- Golang (server-side programming)
- C# (application and web development using .NET)
- PHP (web development)
- SQL (data management)
- Swift (mobile app development on iOS)

4. How Do You Design an Algorithm To Count the Occurrence of a Word in an Article?

- Use the count() function in Python.
- First, split the string by spaces and store it in a list.
- Use count() to find the count of that word in the list.

5. What Is the Best Way To Find the Largest and Smallest Number in an Array?

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Traverse the array iteratively and keep track of the smallest and largest element until the end of the array.

Algorithm:

Input the array elements.

Initialize small = large = arr[0]

Repeat from i = 2 to n

if(arr[i] > large)

large = arr[i]

if(arr[i] < small)

small = arr[i]



Print small and large.

6. What are the 4 principles of object-oriented programming?

Abstraction, encapsulation, polymorphism, and inheritance are the four main theoretical principles of object-oriented programming(**Explain each in brief**)

10. What are the advantages and disadvantages of OOPs?

Advantages of OOPs	Disadvantages of OOPs
OOPs provides enhanced code reusability.	The programmer should be well-skilled and should have excellent thinking in terms of objects as everything is treated as an object in OOPs.
The code is easier to maintain and update.	Proper planning is required because OOPs is a little bit tricky.

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Advantages of OOPs	Disadvantages of OOPs
It provides better data security by restricting data access and avoiding unnecessary exposure.	OOPs concept is not suitable for all kinds of problems.
Fast to implement and easy to redesign resulting in minimizing the complexity of an overall program.	The length of the programs is much larger in comparison to the procedural approach.

11. What is Polymorphism? How compile time polymorphism is different from run time polymorphism?

Polymorphism is composed of two words - “poly” which means “many”, and “morph” which means “shapes”. Therefore Polymorphism refers to something that has many shapes.



In OOPs, Polymorphism refers to the process by which some code, data, method, or object behaves differently under different circumstances or contexts. Compile-time polymorphism and Run time polymorphism are the two types of polymorphisms in OOPs languages.

Compile Time Polymorphism: Compile time polymorphism, also known as Static Polymorphism, refers to the type of Polymorphism that happens at compile time. What it means is that the compiler decides what shape or value has to be taken by the entity in the picture.

Example:

// In this program, we will see how multiple functions are created with the same name,
// but the compiler decides which function to call easily at the compile time itself.

```
class CompileTimePolymorphism{
    // 1st method with name add
    public int add(int x, int y){
        return x+y;
    }
    // 2nd method with name add
```

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```

public int add(int x, int y, int z){
return x+y+z;
}
// 3rd method with name add
public int add(double x, int y){
return (int)x+y;
}
// 4th method with name add
public int add(int x, double y){
return x+(int)y;
}
}
class Test{
public static void main(String[] args){
CompileTimePolymorphism demo=new CompileTimePolymorphism();
// In the below statement, the Compiler looks at the argument types and decides to call method 1
System.out.println(demo.add(2,3));
// Similarly, in the below statement, the compiler calls method 2
System.out.println(demo.add(2,3,4));
// Similarly, in the below statement, the compiler calls method 4
System.out.println(demo.add(2,3.4));
// Similarly, in the below statement, the compiler calls method 3
System.out.println(demo.add(2.5,3));
}
}

```

In the above example, there are four versions of add methods. The first method takes two parameters while the second one takes three. For the third and fourth methods, there is a change of order of parameters. The compiler looks at the method signature and decides which method to invoke for a particular method call at compile time.



Runtime Polymorphism: Runtime polymorphism, also known as Dynamic Polymorphism, refers to the type of Polymorphism that happens at the run time. What it means is it can't be decided by the compiler. Therefore what shape or value has to be taken depends upon the execution. Hence the name Runtime Polymorphism.

Example:

```

class AnyVehicle{
public void move(){

```

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```

System.out.println("Any vehicle should move!!");
}
}
class Bike extends AnyVehicle{
public void move(){
System.out.println("Bike can move too!!");
}
}
class Test{
public static void main(String[] args){
AnyVehicle vehicle = new Bike();
// In the above statement, as you can see, the object vehicle is of type AnyVehicle
// But the output of the below statement will be "Bike can move too!!",
// because the actual implementation of object 'vehicle' is decided during runtime vehicle.move();
vehicle = new AnyVehicle();
// Now, the output of the below statement will be "Any vehicle should move!!",
vehicle.move();
}
}

```

As the method to call is determined at runtime, as shown in the above code, this is called runtime polymorphism.

Compile Time Polymorphism: C++ supports compile-time polymorphism with the help of features like templates, function overloading, and default arguments.



Runtime Polymorphism: C++ supports Runtime polymorphism with the help of features like virtual functions. Virtual functions take the shape of the functions based on the type of object in reference and are resolved at runtime

12. What is a constructor? What are the various types of constructors in C++?

Constructors are special methods whose name is the same as the class name. The constructors serve the special purpose of initializing the objects.

For example, suppose there is a class with the name "MyClass", then when you instantiate this class, you pass the syntax:

```
MyClass myClassObject = new MyClass();
```

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Now here, the method called after “new” keyword - MyClass(), is the constructor of this class. This will help to instantiate the member data and methods and assign them to the object myClassObject.

The most common classification of constructors includes:

Default constructor: The default constructor is the constructor which doesn't take any argument. It has no parameters.

```
class ABC
{
    int x;

    ABC ()
    {
        x = 0;
    }
}
```

Parameterized constructor: The constructors that take some arguments are known as parameterized constructors.



```
class ABC
{
    int x;

    ABC(int y)
    {
        x = y;
    }
}
```

Copy constructor: A copy constructor is a member function that initializes an object using another object of the same class.

```
class ABC
{
    int x;

    ABC(int y)
    {
        x = y;
    }
}
// Copy constructor
```

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```

ABC (ABC abc)
{
    x = abc.x;
}

```

13. What are the stages of the software development lifecycle (SDLC)

The stages of the software development life cycle are:

Planning, Requirements gathering and analysis, Design, Coding and implementation, Testing, Deployment, Maintenance (Explain each stage in brief)



14. Compare Waterfall & Agile models.

The waterfall methodology is a sequential process where tasks are handled in a linear fashion. Generally, it's best used when the requirements are clear, well-known, and entirely fixed. The agile methodology uses an iterative process that relies on cyclic patterns with a high degree of collaboration. Agile provides ample room for feedback and future adjustments, making it a better fit in cases where goals and requirements may shift, or other unknowns are likely to arise.

15. What are the OSI model layers?



The Open Systems Interconnection (OSI) model layers are:

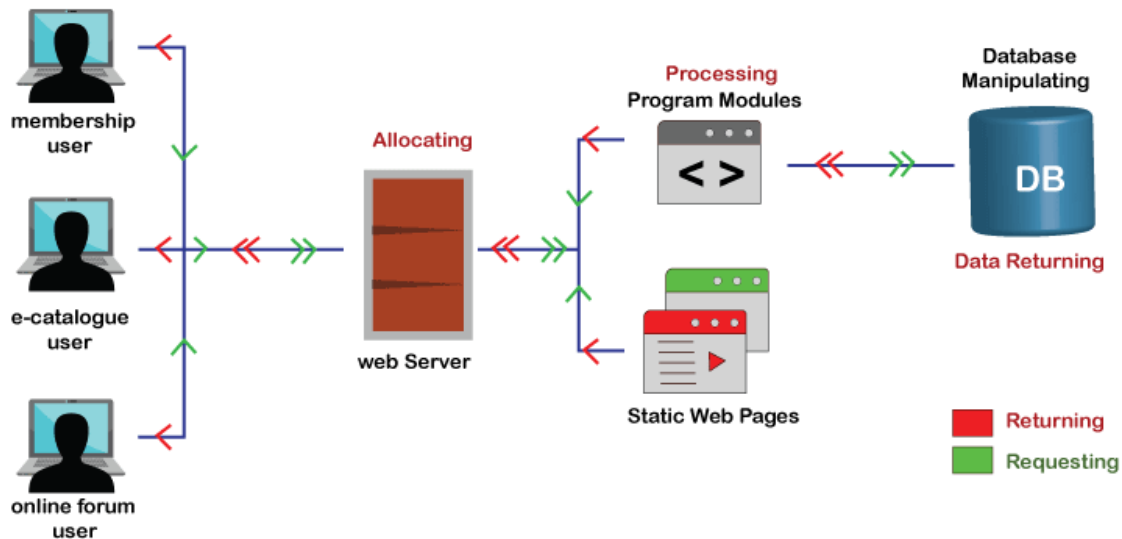
- Physical, transmitting raw bit data over a physical medium
- Data Link, defining the data format
- Network, defining the physical path for the data
- Transport, transmitting data using protocols
- Session, responsible for ports and sessions control
- Presentation, displaying data in a usable format
- Application, enabling human-computer interaction

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16. What is a web application? How does web application work?



- A web-application is an application program that is usually stored on a remote server, and users can access it through the use of Software known as web-browser.
- It is a type of computer program that usually runs with the help of a web browser and also uses many web technologies to perform various tasks on the internet.
- A web application can be developed for several uses, which can be used by anyone like it can be used as an individual or as a whole organization for several reasons.
- In general, web-application does not require downloading them because, as we already discussed, the web application is a computer program that usually resides on the remote server. Any user can access it by using one of the standard web browsers such as Google Chrome, Safari, Microsoft Edge, etc., and most of them are available free for everyone.
- A web application are generally coded using the languages supported by almost every web-browsers such as HTML, JavaScript because these are the languages that rely on the web browsers to render the program executable.
- Some of the web applications are entirely static due to which they not required any processing on the server at all while, on the other hand, some web applications are dynamic and require server-side processing.
- To operate a web- application, we usually required a web server (or we can say some space on the web-server for our programs/application's code) to manage the clients' upcoming requests and required an application server.
- The application server performs the task that requested by the clients, which also may need a database to store the information sometimes. Application server technologies range from ASP.NET, ASP, and ColdFusion to PHP and JSP.

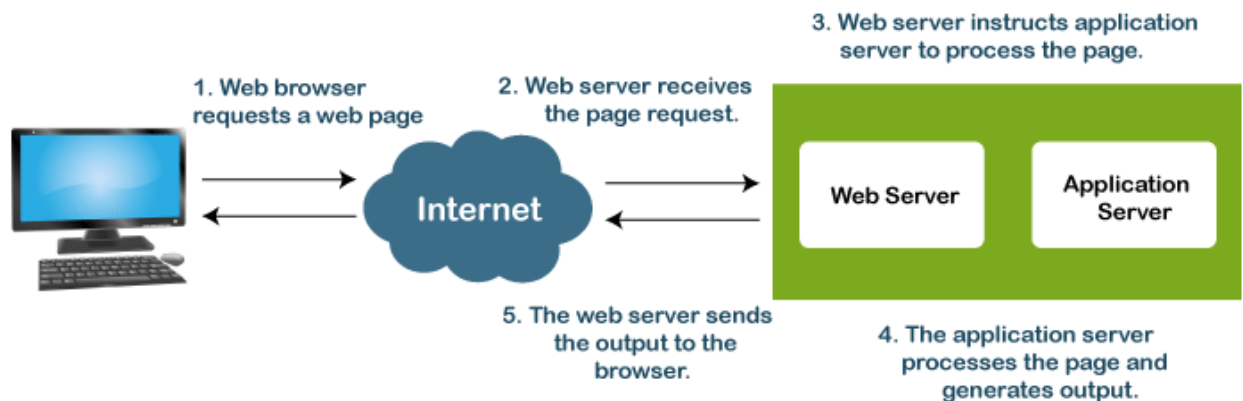
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- A standard web application usually has short development cycles and can be easily developed with a small team of developers. As we all know, most of the currently available web applications on the internet are written using the programming languages such as the HTML (or HyperText Markup Language), CSS(or Cascading Style Sheets), and Javascript that are used in creating front-end interface (Client-side programming).
- To create the web applications script, server-side programming is done by using programming languages such as Java, Python, PHP, and Ruby, etc. Python and Java are the languages that are usually used for server-side programming.

17. Explain the Flow of Web Application



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- In general, a user sends a request to the web-server using web browsers such as Google Chrome, Microsoft Edge, Firefox, etc over the internet.
- Then, the request is forwarded to the appropriate web application server by the web-server.
- Web application server performs the requested operations/ tasks like processing the database, querying the databases; produces the result of the requested data.
- The obtained result is sent to the web-server by the web application server along with the requested data/information or processed data.
- The web server responds to the user with the requested or processed data/information and provides the result to the user's screen.

18. What are Desktop Applications? What is the difference between Desktop & Web Applications? State it's advantages.

Desktop applications are software programs run locally on computer devices. They aren't accessible from a browser, like web-based apps, and require deployment on a personal computer or laptop.

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Desktop vs. Web

DESKTOP	WEB
<ul style="list-style-type: none"> App runs locally Offline access Security Manual updates High speed Installation required 	<ul style="list-style-type: none"> App runs in the cloud Internet access required Cyberattack risks Automated updates Speed depends on a lot of factors Cross-platform access



19. State advantages of Desktop Applications? Is Desktop App better than Web App?

Desktop applications have a lot of benefits:

- Users don't need an internet connection to access them
- They're considered safer options since all the user data is stored on their machines
- Processes are typically executed faster on desktop apps

Not necessarily. Web-based applications have the features desktop apps lack:

They don't require high processing power from the user's device

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They're self-updating

They're accessible from any device with an internet connection, no installation needed

Web-based apps are indeed simpler and don't require much effort from businesses using them. They're usually geared towards the needs of small businesses and growing startups. On the contrary, desktop apps are usually built for mid-sized companies and enterprises.

Apps like Slack and Miro have both desktop and web-based versions. This is perhaps the best solution for app developers and users that want to take the best of both worlds.



20. State Examples of Desktop Applications

- Browsers like Chrome, Edge, Firefox, and Safari.
- Photo and video editing software like Adobe Photoshop, Premier Pro, iMovie, and DaVinci Resolve.
- Programming software like MS Visual Studio, IntelliJ IDEA, and Eclipse.
- Microsoft Word, PowerPoint, and Excel.

21. Challenges of Desktop Applications

1. Need constant updates

Contrary to web SaaS, desktop software isn't self-updating. You need to give consent and update apps manually to access the latest versions. This can be a time-consuming task that often disrupts business processes and workflows.

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2. Integration with other technologies

To integrate several web apps, you don't need any technical skills. Most often, you can go for a built-in integration or use Zapier to build simple workflows. Integrating a desktop app with third-party technologies is barely possible if the app doesn't offer this functionality on its end.

3. Accessing the application

Accessing desktop applications isn't possible unless they're installed on your device. So if you want to implement some desktop-based software solution into your system, you'll need to help everyone involved with the installation and setup process. Moreover, if you happen to be away from your business laptop, you won't be able to access the app by any means.



4. Managed servers

Most desktop applications require a managed server where the data is stored. Maintaining a server not only increases your expenses but also adds to your system admins' workload.

5. Employee onboarding

Onboarding and training employees on a desktop application takes time and effort. While being robust and feature-rich, desktop applications are often difficult to navigate. When implementing a new application, you need to develop a detailed onboarding program to enable your teams to get up to speed fast.

6. Resource intensive

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You need to provide your employees with modern and powerful machines to effectively use desktop apps. Sophisticated solutions typically require great processing power to run without disruptions.

22. What is RDBMS? Enlist advantages of DBMS?

Relational Database Management System(RDBMS) is based on a relational model of data that is stored in databases in separate tables and they are related to the use of a common column. Data can be accessed easily from the relational database using Structured Query Language (SQL).



The advantages of DBMS includes:

- Data is stored in a structured way and hence redundancy is controlled.
- Validates the data entered and provide restrictions on unauthorized access to the database.
- Provides backup and recovery of the data when required.
- It provides multiple user interfaces.

23. What are the various types of relationships in Database? Define them

There are 3 types of relationships in Database:

- **One-to-one:** One table has a relationship with another table having the similar kind of column. Each primary key relates to only one or no record in the related table.
- **One-to-many:** One table has a relationship with another table that has primary and foreign key relations. The primary key table contains only one record that relates to none, one or many records in the related table.
- **Many-to-many:** Each record in both the tables can relate to many numbers of records in another table.

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24. Explain Normalization and De-Normalization.

Answer:

Normalization is the process of removing redundant data from the database by splitting the table in a well-defined manner in order to maintain data integrity. This process saves much of the storage space.

De-normalization is the process of adding up redundant data on the table in order to speed up the complex queries and thus achieve better performance.

25. Enlist some commands of DDL, DML, and DCL.

Answer: Data Definition Language (DDL) commands:

- CREATE to create a new table or database.
- ALTER for alteration.
- TRUNCATE to delete data from the table.
- DROP to drop a table.
- RENAME to rename a table.

Data Manipulation Language (DML) commands:

- INSERT to insert a new row.
- UPDATE to update an existing row.
- DELETE to delete a row.
- MERGE for merging two rows or two tables.

Data Control Language (DCL) commands:

- COMMIT to permanently save.
- ROLLBACK to undo the change.
- SAVEPOINT to save temporarily.