**MODULE 1 &2**

**1. What is Segment ?**

**A network segment is a logical group of computers that share a network resource. This can be accomplished with a router, VLAN, switch segmentation, etc. Unfortunately, with a hub, everyone sees every packet which is why they have pretty much died in the market. Switching is a much better technology. You can segment a network either logically (through VLANs or mapping) or physically (connecting switches back to a core).**

**2. Why UDP is Connectionless protocol ?**

**Unlike TCP, UDP doesn't establish a connection before sending data, it just sends. Because of this, UDP is called "Connectionless".**

**3. Is UDP unreliable transport protocol ? Explain.**

**In UDP, the receiver does not generate an acknowledgement of packet received and in turn, the sender does not wait for any acknowledgement of packet sent. This shortcoming makes this protocol unreliable as well as easier on processing.**

**4. Define Gateway.**

**A gateway is a network node that connects two networks using different protocols together. While a bridge is used to join two similar types of networks, a gateway is used to join two dissimilar networks.**

**5. Why TCP is connection-oriented protocol?**

**TCP is connection oriented. TCP requires that connection between two remote points be established before sending actual data.**

**6. What is process-to process delivery ?**

**To complete the delivery, we need a mechanism todeliver data from one of these processes running on the source host to the corresponding process running on the destination host. The transport layer is responsible for process-to-process delivery-thedelivery of a packet, part of a message, from one process to another.**

**7. Define Congestion.**

**Network congestion in data networking and queueing theory is the reduced quality of service that occurs when a network node or link is carrying more data than it can handle. Typical effects include queueing delay, packet loss or the blocking of new connections.**

**8. What is IPV4 ?**

**Internet Protocol version 4 (IPv4) is the fourth version of the Internet Protocol (IP). It is one of the core protocols of standards-based internet working methods in the Internet, and was the first version deployed for production in the ARPANET in 1983.**

**9. Write down the classification of routing table.**

**https://docs.oracle.com/cd/E19253-01/816-4554/gdyen/index.html**

**10. What is IPV6 ?**

**Internet Protocol Version 6 (IPv6) is an Internet Protocol (IP) used for carrying data in packets from a source to a destination over various networks. IPv6 is the enhanced version of IPv4 and can support very large numbers of nodes as compared to IPv4. It allows for 2128 possible node, or address, combinations.**

**11. What is meant by quality of service ?**

**Quality of service (QoS) refers to a network's ability to achieve maximum bandwidth and deal with other network performance elements like latency, error rate and uptime.**

**12. What is Perl?**  
Perl is a stable, cross platform programming language.

Though Perl is not officially an acronym but few people used it as Practical Extraction and Report Language.

It is used for mission critical projects in the public and private sectors.

Perl is an *Open Source* software, licensed under its *Artistic License*, or the *GNU General Public License* .

Perl was created by Larry Wall.  
Perl 1.0 was released to usenet's alt.comp.sources in 1987  
At the time of writing this tutorial, the latest version of perl is 5.16.2 Perl is listed in the *Oxford English Dictionary*.

**13. What are the features of Perl programming?**  
Perl takes the best features from other languages, such as C, awk, sed, sh, and BASIC, among others.

Perls database integration interface DBI supports third-party databases including Oracle, Sybase, Postgres, MySQL and others.

Perl works with HTML, XML, and other mark-up languages.

Perl supports Unicode.

Perl is Y2K compliant.

Perl supports both procedural and object-oriented programming.

Perl interfaces with external C/C++ libraries through XS or SWIG.

Perl is extensible. There are over 20,000 third party modules available from the Comprehensive Perl Archive Network (CPAN).

The Perl interpreter can be embedded into other systems.

**14. What are the benefits of Perl programming in using it in web based applications?**

Perl used to be the most popular web programming language due to its text manipulation capabilities and rapid development cycle.

Perl is widely known as " the duct-tape of the Internet".  
Perl can handle encrypted Web data, including e-commerce transactions.  
Perl can be embedded into web servers to speed up processing by as much as 2000%. Perl's mod\_perl allows the Apache web server to embed a Perl interpreter.  
Perl's DBI package makes web-database integration easy.

**15. Is perl a case sensitive language?**

Yes! Perl is a case sensitive programming language.

**16. What is a perl identifier?**

A Perl identifier is a name used to identify a variable, function, class, module, or other object. A Perl variable name starts with either $, @ or % followed by zero or more letters, underscores, and digits (0 to 9).

**17.What are data types that perl supports?**

Perl has three basic data types − scalars, arrays of scalars, and hashes of scalars, also known as associative arrays.

**18. What are scalar data types in perl?**

Scalars are simple variables. They are preceded by a dollar sign . A scalar is either a number, a string, or a reference. A reference is actually an address of a variable, which we will see in the upcoming chapters.

**19. What are Arrays in perl?**

Arrays are ordered lists of scalars that you access with a numeric index which starts with 0. They are preceded by an "at" sign .

**20. What are Hashes in perl?**

Hashes are unordered sets of key/value pairs that you access using the keys as subscripts. They are preceded by a percent sign .

**21. How will you declare a variable in perl?**

Perl variables do not have to be explicitly declared to reserve memory space. The declaration happens automatically when you assign a value to a variable. The equal sign is used to assign values to variables.

**22. What is variable context in perl?**  
Perl treats same variable differently based on Context, i.e. situation where a variable is being used.

**23. What is scalar context?**  
Assignment to a scalar variable evaluates the right-hand side in a scalar context.

**24. What is a list context?**  
Assignment to an array or a hash evaluates the right-hand side in a list context.

**25. What is boolean context?**  
Boolean context is simply any place where an expression is being evaluated to see whether it's true or false.

**26. What is void context?**

This context not only doesn't care what the return value is, it doesn't even want a return value.

**27. What is interpolative context?**  
This context only happens inside quotes, or things that work like quotes.

**28. What is the difference between single quoted string and double quoted string?**

Single quoted string prints the perl variable as a string whereas double quoted string evaluates the variable and used to get the variable's value.

*#!/usr/bin/perl*

$var = "This is string scalar!";

$quote = 'I m inside single quote - $var';

$double = "This is inside double quote - $var";

$escape = "This example of escape -\tHello, World!";

**print** "var = $var\n";  
**print** "quote = $quote\n"; **print** "double = $double\n"; **print** "escape = $escape\n";

This will produce the following result −

**var** = **This is string** scalar!  
quote = I m inside single quote - $var  
**double** = **This is** inside **double** quote - **This is string** scalar! escape = **This** example of escape - **Hello**, **World**!

**29. What is the purpose of \_FILE\_ literal in Perl?**

It is used to get the current file name.

**30. What is the purpose of \_LINE\_ literal in Perl?**

It is used to get the current line number.

**31. How will you create Hashes in perl?**

Hashes are created in one of the two following ways. In the first method, you assign a value to a named key on a one-by-one basis −

$data{'John Paul'} = 45;

$data{'Lisa'} = 30;

$data{'Kumar'} = 40;

In the second case, you use a list, which is converted by taking individual pairs from the list: the first element of the pair is used as the key, and the second, as the value. For example −

%data = ('John Paul', 45, 'Lisa', 30, 'Kumar', 40);

**32. How will you get element from Hashes in perl?**

When accessing individual elements from a hash, you must prefix the variable with a dollar sign append the element key within curly brackets after the name of the variable. For example −

*#!/usr/bin/perl*

%data = ('John Paul' =>45, 'Lisa' =>30, 'Kumar' =>40);

**print** "$data{'John Paul'}\n"; **print** "$data{'Lisa'}\n"; **print** "$data{'Kumar'}\n";

This will produce the following result −

45

30

40

**33. How will you get all keys from Hashes in perl?**  
You can get a list of all of the keys from a hash by using keys function, which has the following syntax −

keys %HASH

This function returns an array of all the keys of the named hash. Following is the example −

*#!/usr/bin/perl*

%data = ('John Paul' =>45, 'Lisa' =>30, 'Kumar' =>40);

@names = keys %data;

**print** “$names[0]\n";

**print** "$names[1]\n";

**print** "$names[2]\n";

This will produce the following result −

**Lisa**

**John Paul**

**Kumar**

**34. How will you get all values from Hashes in perl?**  
You can get a list of all of the values from a hash by using values function, which has the following syntax −

values %HASH

This function returns an array of all the values of the named hash. Following is the example −

*#!/usr/bin/perl*

%data = ('John Paul' =>45, 'Lisa' =>30, 'Kumar' =>40);

@ages = values %data;

**print** "$ages[0]\n"; **print** "$ages[1]\n"; **print** "$ages[2]\n";

This will produce the following result −

30

45

40

**35. What is the purpose of \*\* operator in perl? What is the purpose of <=> operator?**

Exponent − Performs exponential calculation on operators. Assume variable b holds 20 then b will give 10 to the power 20.

It checks if the value of two operands are equal or not, and returns -1, 0, or 1 depending on whether the left argument is numerically less than, equal to, or greater than the right argument.

Assume Variable a holds 10 and variable b holds 20 then $a <=> $b returns -1.

**36. What is the purpose of lt operator in perl? What is the purpose of gt operator?**

**lt:** It returns true if the left argument is stringwise less than the right argument.

**gt:** It returns true if the left argument is stringwise greater than the right argument.

**37. What is the difference between localtime() and gmtime() functions in perl?**

localtime will return the current local time on the machine that runs the script and gmtime will return the universal Greenwich Mean Time, or GMT .

* + - 1. **What is JavaScript?**

JavaScript is a scripting language. It is different from Java language. It is object-based, lightweight, cross-platform translated language. It is widely used for client-side validation. The JavaScript Translator (embedded in the browser) is responsible for translating the JavaScript code for the web browser.

* + - 1. **Name some of the JavaScript features.**

Following are the features of JavaScript −

* JavaScript is a lightweight, interpreted programming language.
* JavaScript is designed for creating network-centric applications.
* JavaScript is complementary to and integrated with Java.
* JavaScript is is complementary to and integrated with HTML.
* JavaScript is open and cross-platform.
  + - 1. **What are the advantages of using JavaScript?**

Following are the advantages of using JavaScript −

* **Less server interaction −** You can validate user input before sending the page off to the server. This saves server traffic, which means less load on your server.
* **Immediate feedback to the visitors −** They don't have to wait for a page reload to see if they have forgotten to enter something.
* **Increased interactivity −** You can create interfaces that react when the user hovers over them with a mouse or activates them via the keyboard.
* **Richer interfaces −** You can use JavaScript to include such items as drag-and-drop components and sliders to give a Rich Interface to your site visitors.
  + - 1. **What are disadvantages of using JavaScript?**

We can not treat JavaScript as a full fledged programming language. It lacks the following important features −

* Client-side JavaScript does not allow the reading or writing of files. This has been kept for security reason.
* JavaScript can not be used for Networking applications because there is no such support available.
* JavaScript doesn't have any multithreading or multiprocess capabilities.
  + - 1. **Is JavaScript a case-sensitive language? How can you create an Array in JavaScript?**
* Yes! JavaScript is a case-sensitive language. This means that language keywords, variables, function names, and any other identifiers must always be typed with a consistent capitalization of letters.
* You can define arrays using the array literal as follows −

var x = []; var y = [1, 2, 3, 4, 5];

* + - 1. **How to read elements of an array in JavaScript?**

An array has a length property that is useful for iteration. We can read elements of an array as follows −

var x = [1, 2, 3, 4, 5];

for (vari = 0; i<x.length; i++) {

// Do something with x[i]

}

* + - 1. **Which built-in method returns the length of the string? Which built-in method removes the last element from an array and returns that element?**
* length() method returns the length of the string.
* pop() method removes the last element from an array and returns that element.
  + - 1. **Which built-in method returns the characters in a string beginning at the specified location? Which built-in method returns the calling string value converted to lower case?**
* substr() method returns the characters in a string beginning at the specified location through the specified number of characters.
* toLowerCase() method returns the calling string value converted to lower case.
  + - 1. **What is Date object in JavaScript?**
* The Date object is a datatype built into the JavaScript language. Date objects are created with the new Date( ).
* Once a Date object is created, a number of methods allow you to operate on it. Most methods simply allow you to get and set the year, month, day, hour, minute, second, and millisecond fields of the object, using either local time or UTC (universal, or GMT) time.
  + - 1. **How to create a Cookie using JavaScript?**
* The simplest way to create a cookie is to assign a string value to the document.cookie object, which looks like this −

Syntax −

document.cookie = "key1 = value1; key2 = value2; expires = date";

* Here expires attribute is option. If you provide this attribute with a valid date or time then cookie will expire at the given date or time and after that cookies' value will not be accessible.
  + - 1. **What do mean by Cookies? Are Cookies secure?**

The cookie is a message that the web server pass to your web browser when you visit the internet sites,the browser stores the message in a small file,When you request another page from the server, your browser sends the cookie back to the server.

**Cookies**do not act maliciously on computer systems. They are merely text files that can be deleted at any time - they are not [plug ins](https://www.webopedia.com/TERM/P/plug_in.html) nor are they programs. **Cookies**cannot be used to spread [viruses](https://www.webopedia.com/TERM/V/virus.html) and they cannot access your hard drive. This does not mean that cookies are not relevant to a user's privacy and anonymity on the Internet. **Cookies**cannot read your hard drive to find out information about you; however, any personal information that you give to a Web site, including credit card information, will most likely be stored in a cookie unless you have turned off the cookie feature in your browser. In only this way are cookies a threat to privacy. The **cookie**will only contain information that you freely provide to a Web site.

* + - 1. **What are the advantages of using Cookies?**

One of the most advantages of the cookies is their persistence , When the cookie is set on the client’s browser , it can persist for days , months or years , This makes it easy to save user preferences & visit information , The cookies are stored on the client’s hard disk , so , if the server crashes , the cookies are still available.

**50. Why the applet class should be kept as public?**

**Applet classes need to be declared as a public becomes the applet classes are access from HTML document that means from outside code. Otherwise, an applet will not be accessible from an outside code i.e an HTML.**

**51. What are the steps involved in Applet development?**

**1. Create/Edit a Java source file. This file must contain a class which extends Applet class.**

**2. Compile your program using javac Execute the appletviewer, specifying the name of your applet's source file or html file. In case the applet information is stored in html file then Applet can be invoked using java enabled web browser.**

**52. What is the order of method invocation in an Applet?**

**The Applet’s life cycle methods are as follows:**

**• public void init() : Initialization method called only once by the browser.**

**• public void start() : Method called after init() and contains code to start processing. If the user leaves the page and returns without killing the current browser session, the start () method is called without being preceded by init ().**

**• public void stop() : Stops all processing started by start (). Done if user moves off page.**

**• public void destroy() : Called if current browser session is being terminated. Frees all resources used by the applet.**

**53. What is an Applet? Should applets have constructors?**

**Applets are small programs transferred through Internet, automatically installed and run as part of web-browser. Applets implements functionality of a client. Applet is a dynamic and interactive program that runs inside a Web page displayed by a Java-capable browser. We don?t have the concept of Constructors in Applets. Applets can be invoked either through browser or through Applet viewer utility provided by JDK.**

**54. What tags are mandatory when creating HTML to display an applet?**

**code, height, width**

**55. What packages are mandatory when creating an applet to display something?**

**import java.applet.Applet;**

**import java.awt.Graphics;**

**import java.awt.Color;**

**MODULE 1 &2**

1. Briefly explain different operations of UDP.

The user datagram protocol - UDP is the datagram oriented protocol without overhead for opening the connection with the help of 3 way handshake, closing the connection and maintaining the connection. This UDP is very efficient for the multicast or broadcast type of the network transmission. It has only the error checking mechanism with the help of checksums. There are no sequencing of the data in the UDP and the delivery of the data cannot be guaranteed in that. It is simpler, more efficient and faster than the TCP. Although, UDP is less robust than the TCP. Here demultiplexing and multiplexing are possible in the UDP by means of the UDP port numbers. Additionally, there is no transmission of the lost packets in the UDP.

As it is a connectionless protocol, it is not at all reliable protocols when compared to the TCP. It is capable to perform the fundamental error checking too. It will never offer any sequencing of the data. Hence, the data will arrive at the destination device in the various orders from which it is sent. This will occur in the large networks like the internet, where datagrams takes various paths to a destination and also experience the delay in the different router. The UDP is generally the IP with the transport layer port addressing. Sometimes this UDP is also known as the wrapper protocol.

1. Briefly explain different TCP services.

The TCP is referred as the reliable protocol, which is responsible for breaking up the messages into the TCP segments as well as resembling it in a receiving side. The major purpose of the TCP is to give the reliable and secure logical connection, service or circuit between the pairs of the processes. To offer this type of service on top of the less reliable internet communication system needs facilities in areas such as security, precedence, multiplexing, reliability, connections and basic data transfer. The main purpose of the TCP is flow control and error recovery. As it is connection based protocol, which means that before allowing any data it accomplishes connections and also terminates it upon completion.

During the connection, accomplishment both server and client agree upon the sequence and also acknowledge numbers. The implicit client notifies the server of its source ports. The sequence is the characteristic of the TCP data segment. This sequence begins with the random number and each time the new packet is sent, then the sequence is incremented by a number of bytes sent in the previous segment of the TCP. Acknowledge segment is moreover the same, but from a receiver side. This does not comprise data and are equal to the sender's sequence numbers increased by the number of the received bytes. The ACK segment acknowledges that the host has got the sent data.

TCP is the connection oriented protocol, that means the devices must open the connection before transferring data and must lose a connection gracefully after transferring the data. It also assures the reliable data delivery to the destinations.

1. Compare Open loop Congestion Control and Close loop Congestion Control.

These two types of control system have contrast with each other. They have dissimilarities some of which are discussed below:

Effect of output

– An open loop control system acts completely on the basis of input and the output has no effect on the control action.

– A closed loop control system considers the current output and alters it to the desired condition. The control action in these systems is based on the output.

Reaction to Internal and External Disturbances

– An open loop control system works on fixed operation conditions and there are no disturbances.

– A closed loop control system doesn’t encounter and react on external disturbances or internal variations.

Stability

– Open loop control systems are mostly stable.

– In closed loop control systems stability is a major issue.

Effect on gain

– There is no effect on gain.

– There is no-linear change in system gain.

Implementation

– The structure of open loop control system is rather easy to construct. These systems can be easily implemented.

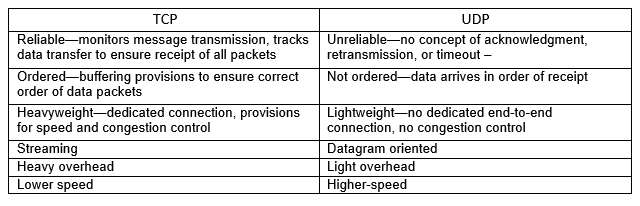
– The working principle and structures of closed loop control systems are rather complex and they are often difficult to implement.

Cost

– As an open loop control system is easy to implement, it needs lesser number of components to be constructed. Such systems need good calibration and lesser power rating. The overall cost of these systems is low.

– As the principle is complex, a closed loop control system needs larger number of components than an open loop control systems. These systems comparatively need less calibration and higher power rating. The overall cost of these systems is higher.

1. What is the Difference between TCP and UDP ?



1. Explain the mechanism of Reverse Address Resolution Protocol.

RARP (Reverse Address Resolution Protocol) is a protocol by which a physical machine in a local area network can request to learn its IP address from a gateway server's Address Resolution Protocol (ARP) table or cache. A network administrator creates a table in a local area network's gateway router that maps the physical machine (or Media Access Control - MAC address) addresses to corresponding Internet Protocol addresses. When a new machine is set up, its RARP client program requests from the RARP server on the router to be sent its IP address. Assuming that an entry has been set up in the router table, the RARP server will return the IP address to the machine which can store it for future use.

RARP is available for Ethernet, Fiber Distributed-Data Interface, and token ring LANs.

1. What is Network address translation ? Explain.

A NAT (Network Address Translation or Network Address Translator) is the virtualization of Internet Protocol (IP) addresses. NAT helps improve security and decrease the number of IP addresses an organization needs.

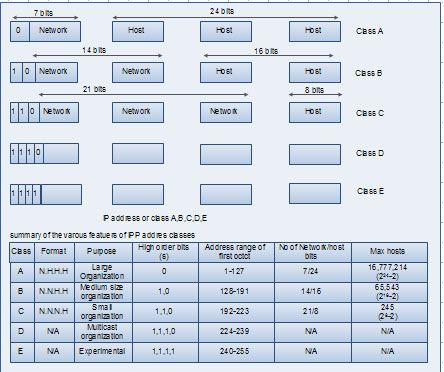
NAT gateways sit between two networks, the inside network and the outside network. Systems on the inside network are typically assigned IP addresses that cannot be routed to external networks (e.g., networks in the 10.0.0.0/8 block). A few externally valid IP addresses are assigned to the gateway. The gateway makes outbound traffic from an inside system appear to be coming from one of the valid external addresses. It takes incoming traffic aimed at a valid external address and sends it to the correct internal system. This helps ensure security, since each outgoing or incoming request must go through a translation process that also offers the opportunity to qualify or authenticate incoming streams and match them to outgoing requests, for example.

NAT conserves the number of globally valid IP addresses a company needs, and in combination with Classless Inter-Domain Routing (CIDR) has done a lot to extend the useful life of IPv4 as a result. NAT is described in general terms in IETF RFC 1631.

The NAT mechanism ("natting") is a router feature, and is often part of a corporate firewall. NAT gateways can map IP addresses in several ways:

* From a local IP address to one global IP address statically;
* From a local IP address to any of a rotating pool of global IP addresses a company may have;
* From a local IP address plus a particular TCP port to a global IP address or one in a pool of ports;
* From a global IP address to any of a pool of local IP addresses on a round-robin basis.

1. Explain different classes of Classful addressing.



1. What is 3-way handshake in TCP ?

A three-way handshake is a method used in a TCP/IP network to create a connection between a local host/client and server. It is a three-step method that requires both the client and server to exchange SYN and ACK (acknowledgment) packets before actual data communication begins.

A three-way handshake is also known as a TCP handshake.

A three-way handshake is primarily used to create a TCP socket connection. It works when:

A client node sends a SYN data packet over an IP network to a server on the same or an external network. The objective of this packet is to ask/infer if the server is open for new connections.

The target server must have open ports that can accept and initiate new connections. When the server receives the SYN packet from the client node, it responds and returns a confirmation receipt – the ACK packet or SYN/ACK packet.

The client node receives the SYN/ACK from the server and responds with an ACK packet.

Upon completion of this process, the connection is created and the host and server can communicate.

1. Explain the mechanism of Address Resolution Protocol.

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address that is recognized in the local network. For example, in IP Version 4, the most common level of IP in use today, an address is 32 bits long. In an Ethernet local area network, however, addresses for attached devices are 48 bits long. (The physical machine address is also known as a Media Access Control or MAC address.) A table, usually called the ARP cache, is used to maintain a correlation between each MAC address and its corresponding IP address. ARP provides the protocol rules for making this correlation and providing address conversion in both directions.

1. Explain the concept of subnetting and supernetting.

**What is Subnetting?**

Process of dividing an IP network in to sub divisions is called subnetting. Subnetting divides an IP address in to two parts as the network (or routing prefix) and the rest field (which is used to identify a specific host). CIDR notation is used to write a routing prefix. This notation uses a slash (/) to separate the network starting address and the length of the network prefix (in bits). For example, in IPv4, 192.60.128.0/22 indicates that 22 bits are allocated for the network prefix and the remaining 10 bits are reserved for the host address. In addition, routing prefix can also be represented using the subnet mask. 255.255.252.0 (11111111.11111111.11111100.00000000)

is the subnet mask for 192.60.128.0/22. Separating the network portion and the subnet portion of an IP address is done by performing a bitwise AND operation between the IP address and the subnet mask. This would result in identifying the network prefix and the host identifier.

**What is Supernetting?**

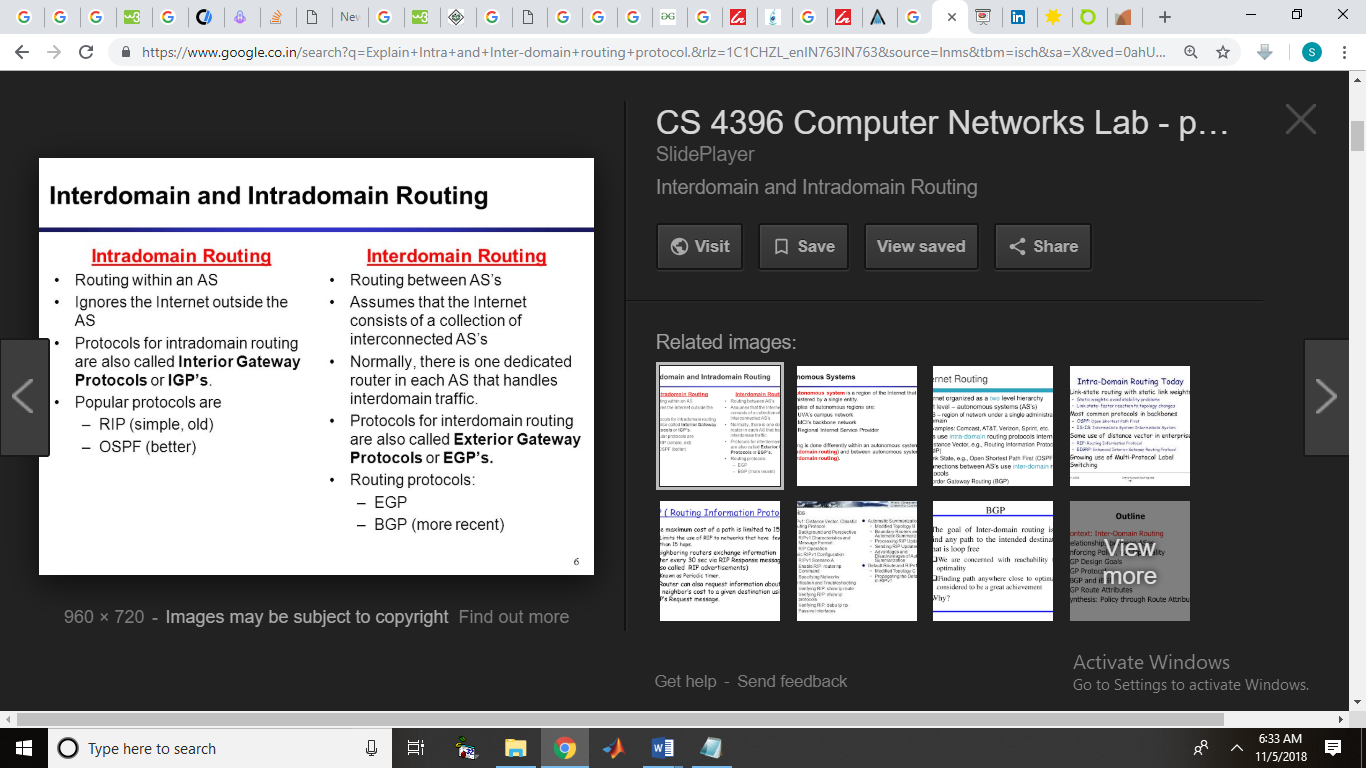
Supernetting is the process of combining several IP networks with a common network prefix. Supernetting was introduced as a solution to the problem of increasing size in routing tables. Supernetting also simplifies the routing process. For example, the subnetworks 192.60.2.0/24 and 192.60.3.0/24 can be combined in to the supernetwork denoted by 192.60.2.0/23. In the supernet, the first 23 bits are the network part of the address and the other 9 bits are used as the host identifier. So, one address will represent several small networks and this would reduce the number of entries that should be included in the routing table. Typically, supernetting is used for class C IP addresses (addresses beginning with 192 to 223 in decimal), and most of the routing protocols support supernetting. Examples of such protocols are Border Gateway Protocol (BGP) and Open Shortest Path First (OSPF). But, protocols such as Exterior Gateway Protocol (EGP) and the Routing Information Protocol (RIP) do not support supernetting.

1. Write short note on IGMP.

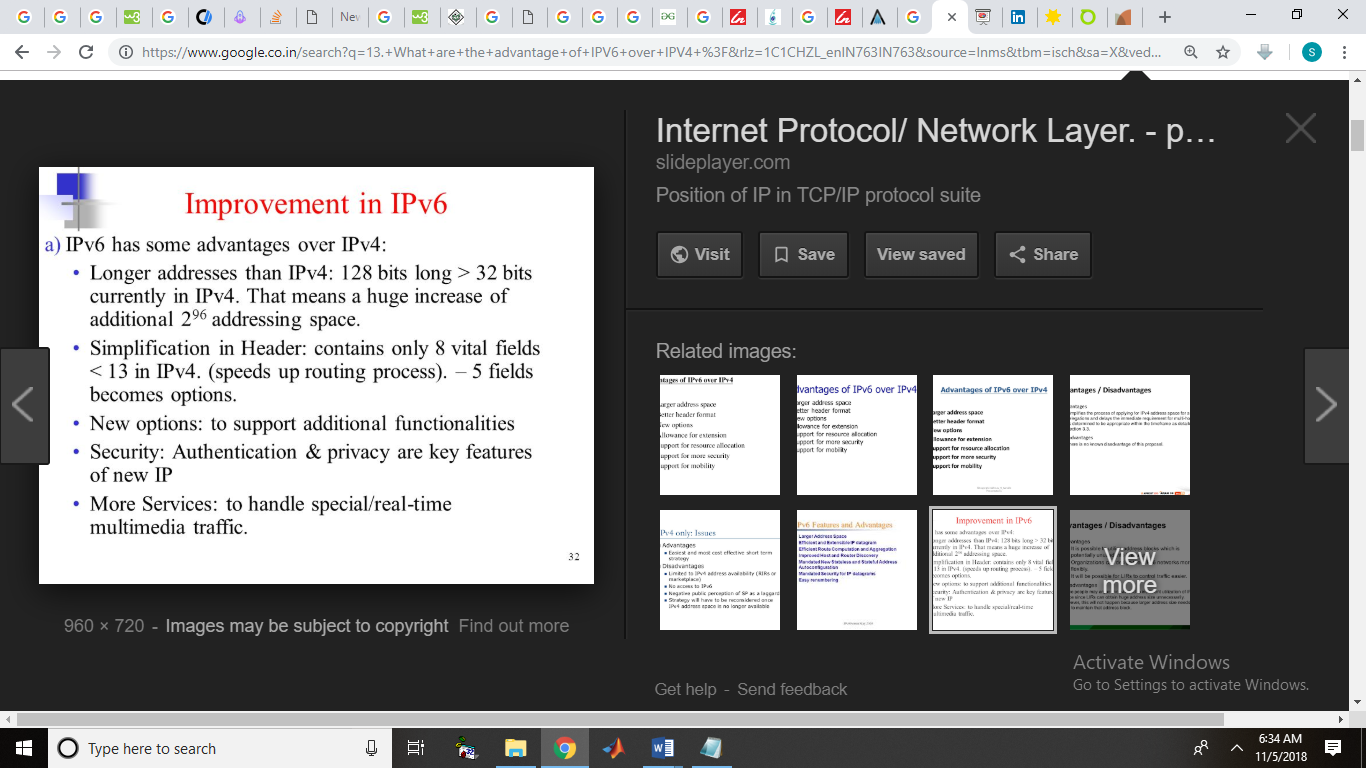
The Internet Group Management Protocol (IGMP) is an Internet protocol that provides a way for an Internet computer to report its multicast group membership to adjacent routers. Multicasting allows one computer on the Internet to send content to multiple other computers that have identified themselves as interested in receiving the originating computer's content. Multicasting can be used for such applications as updating the address books of mobile computer users in the field, sending out company newsletters to a distribution list, and "broadcasting" high-bandwidth programs of streaming media to an audience that has "tuned in" by setting up a multicast group membership.

1. What is autonomous system ? Explain Intra and Inter-domain routing protocol.

On the Internet, an autonomous system (AS) is the unit of router policy, either a single network or a group of networks that is controlled by a common network administrator (or group of administrators) on behalf of a single administrative entity (such as a university, a business enterprise, or a business division). An autonomous system is also sometimes referred to as a routing domain. An autonomous system is assigned a globally unique number, sometimes called an Autonomous System Number (ASN).



1. What are the advantage of IPV6 over IPV4 ?



1. What do you mean by Net Id and Host Id.

In classful addressing, an IP address of class A, B and C is divided into netid and hostid. The netid determines the network address while the hostid determines the host connected to that network.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
| Class A | Netid | Hostid | | |
| Class B | Netid | | Hostid | |
| Class C | Netid | | | Hostid |
| Class D | Multicast Address | | | |
| Class E | Reserved for future use | | | |

1. What are the factors that measure network performance ?

**Factors Affecting Network Performance**

**Latency:** It can take a long time for a packet to be delivered across intervening networks. In reliable protocols where a receiver acknowledges delivery of each chunk of data, it is possible to measure this as round-trip time.

**Packet loss:** In some cases, intermediate devices in a network will lose packets. This may be due to errors, to overloading of the intermediate network, or to intentional discarding of traffic in order to enforce a particular service level.

**Retransmission:** When packets are lost in a reliable network, they are retransmitted. This incurs two delays: First, the delay from re-sending the data; and second, the delay resulting from waiting until the data is received in the correct order before forwarding it up the protocol stack.

**Throughput:** The amount of traffic a network can carry is measured as throughput, usually in terms such as kilobits per second. Throughput is analogous to the number of lanes on a highway, whereas latency is analogous to its speed limit

1. How DNS is used in internet ? Also explain different domains of DNS.

**TLD - Top Level Domains**

These are at the highest level in the DNS structure of the Internet. There are several different types of TLD's, being:

**ccTLD - country code Top Level Domains**

Two letter domains established for geographical locations; for example; .au signifies Australia. When originally designated, usually only residents of a country could register their corresponding ccTLD; but over the years quite a few countries have allowed parties outside their shores to register website names. An example of this is Tuvalu (.tv).

In the case of [.au domain names](https://www.domainregistration.com.au/domains/), strict rules are still in place (and that's a good thing). For example, .com.au registrants must still be Australians or have registered business interests in Australia. The registration eligibility criteria for au names has meant .au is still strongly associated with Australia and has fostered a great deal of trust and confidence in local and even overseas online shoppers.

**gTLD - generic Top Level Domain**

The best known generic TLD's include .com, .net, .biz, .org and .info - these can be registered by anyone, anywhere in the world. However, some of the new gTLD's more recently released have various restrictions.

**IDN ccTLD - internationalised country code top-level domains**

A top-level name with a specially encoded format that allows it to be displayed in a non-Latin character set (i.e. special characters).

Below the TLD's are various other levels:

**Second level**

Directly below a TLD in the DNS hierarchy, e.g. .com.au

**Third level**

Directly below a second level in the DNS hierarchy. e.g. domainregistration.com.au

The difference between second and third level can be a little confusing. For example, hotmail.com is considered a second level domain, but hotmail.com.au would be classed as a third level.

**Subdomain**

Part of a higher ranked domain name in DNS hierarchy; e.g. example.domainregistration.com.au.

1. What is DNS ? Explain how the protocol works.

What is it ?

DNS means "Domain Name System". Basically it's the system that translates an domain name (www.google.com) into an IP address (173.194.40.174) which is the unique identifier of some piece of hardware on a network.

You can understand the use for such a system : it's much easier to remember the name than the address. Moreover, a name can translate to several address depending on the time, the load of the server etc.

How Does It Work ?

The first step is to register you domain name. To put it simply, you buy it so that you are the one who will be able to make the association name <-> address. Once you are the proud owner of the domain name, you have access to what is called the "DNS zone", which is basically a list of pairs name <-> IP. It's a list because when you own a domain name, you can also use sub-domains (mail.google.com, plus.google.com, ...), each of them can be associated to a different address. Once you have configured the DNS zone, it is stored on your registar's server.

What is left to explain is how the queries are made. How does your computer knows the IP address for a given name ? When you type www.google.com in your browser, the browser starts by asking the translation to a root nameserver. There are 13 of them, and they are the entry points of the DNS protocol.

When they receive a request, they usually don't know the answer (as there are too many domain names) but they know who to ask. For example, they know that www.google.com depends on the "com" DNS server (which handles the domain names with the .com TLD). So the request in then sent to this server, which will in its turn know who to ask, and this continues until the request is sent to your registar's server, which will know the answer your computer is looking for.

Now in reality, this is not the real process. As you can imagine, the number of requests is overwhelmingly huge, and the 13 servers would create a bottleneck a lot too small for every request. There are complex caching systems used to relieve the pressure on these servers and they are, in fact, involved in only a small part of the traffic.

Caching DNS servers will store the answer to DNS queries for a given time, and answer directly if the same query arrives again in this time frame. In practice, your computer will ask these caching servers, and the caching server will ask the authoritative servers for the answer (if it's not in the cache).

1. Explain WWW.

The World Wide Web (WWW) is a network of online content that is formatted in HTML and accessed via HTTP. The term refers to all the interlinked HTML pages that can be accessed over the Internet. The World Wide Web was originally designed in 1991 by Tim Berners-Lee while he was a contractor at CERN.

The World Wide Web is most often referred to simply as "the Web."

The World Wide Web is what most people think of as the Internet. It is all the Web pages, pictures, videos and other online content that can be accessed via a Web browser. The Internet, in contrast, is the underlying network connection that allows us to send email and access the World Wide Web. The early Web was a collection of text-based sites hosted by organizations that were technically gifted enough to set up a Web server and learn HTML. It has continued to evolve since the original design, and it now includes interactive (social) media and user-generated content that requires little to no technical skills.

We owe the free Web to Berners-Lee and CERN’s decision to give away one of the greatest inventions of the century.

1. Write short note on Digital Signature.

A digital signature is a mathematical technique used to validate the authenticity and integrity of a message, software or digital document. The digital equivalent of a handwritten signature or stamped seal, a digital signature offers far more inherent security, and it is intended to solve the problem of tampering and impersonation in digital communications.

Digital signatures can provide the added assurances of evidence of origin, identity and status of an electronic document, transaction or message and can acknowledge informed consent by the signer.

In many countries, including the United States, digital signatures are considered legally binding in the same way as traditional document signatures. The United States Government Publishing Office publishes electronic versions of the budget, public and private laws, and congressional bills with digital signatures.

1. Explain the format of HTTP Request Message.

**HTTP Request Structure from Client**

A simple request message from a client computer consists of the following components:

* A request line to get a required resource, for example a request GET /content/page1.html is requesting a resource called /content/page1.html from the server.
* Headers (Example – Accept-Language: EN).
* An empty line.
* A message body which is optional.

All the lines should end with a carriage return and line feed. The empty line should only contains carriage return and line feed without any spaces.

1. Explain the format of HTTP Response Message ?

A simple response from the server contains the following components:

* HTTP Status Code (For example HTTP/1.1 301 Moved Permanently, means the requested resource was permanently moved and redirecting to some other resource).
* Headers (Example – Content-Type: html)
* An empty line.
* A message body which is optional.

All the lines in the server response should end with a carriage return and line feed. Similar to request, the empty line in a response also should only have carriage return and line feed without any spaces.

**22. Develop and demonstrate a XHTML file that includes JavaScript script for the following problem:**

**i. Input: A number n obtained using prompt.**

**ii. Output: The first n Fibonacci numbers.**

<html>

<head>

<title>Program 2a</title>

</head>

<script type="text/javascript">

<!--

function fib() {

var n = prompt("Enter N: ","");

fib1=0;

fib2=1;

fib=0;

document.write("<h2>" +fib1 +"

\n</h2>");

document.write("<h2>" +fib2 +"

\n</h2>");

for(i=0;i<n;i++) {

fib = fib1+fib2;

fib1=fib2;

fib2=fib;

document.write("<h2>" +fib +"

\n</h2>");

}}

--

>

</script>

<body onload="fib()">

</body>

**23. Develop and demonstrate a XHTML file that includes JavaScript script for the following problem:**

**i. Input: A number n obtained using prompt.**

**ii. Output: A table of numbers from 1 to n and their squares using alert.**

<html>

<head>

<title>Program 2b</title>

</head>

<script type="text/javascript">

<!--

function sqr()

{

var n = prompt("Enter N: ","");

msgstr ="The square of numbers from 1 to "+n +" is: \n";

for(i=1;i<=n;i++)

{

msgstr = msgstr +i +"------->" +i\*i +"\n";

}

alert(msgstr);

}

-->

</script>

<body onload="sqr()">

</body

**24. a) Develop and demonstrate a XHTML file that includes JavaScript script for the following problem:**

**· Celsius to Fahrenheit**

**b) Explain different types of operators present in JavaScript.**

<!DOCTYPE html>

<html>

<title>Fahrenheit to Celcius Temperature Converter</title>

<body>

<h2>Temperature Converter</h2>

<p>Type a value in the Fahrenheit field to convert the value to Celsius:</p>

<p>

<label>Fahrenheit</label>

<input id="inputFahrenheit" type="number" placeholder="Fahrenheit" oninput="temperatureConverter(this.value)" onchange="temperatureConverter(this.value)">

</p>

<p>Celcius: <span id="outputCelcius"></span></p>

<script>

function temperatureConverter(valNum) {

valNum = parseFloat(valNum);

document.getElementById("outputCelcius").innerHTML=(valNum-32)/1.8;

}

</script>

</body>

</html>

**b)**

JavaScript supports the following types of operators.

* Arithmetic Operators
* Comparison Operators
* Logical (or Relational) Operators
* Assignment Operators
* Conditional (or ternary) Operators

**25. Change background color of a web page depending on time of day using JavaScript.**

<script type="text/javascript">

var now = new Date();

var hours = now.getHours();

//Keep in code - Written by Computerhope.com

//Place this script in your HTML heading section

document.write('It\'s now: ', hours, '<br><br>');

document.bgColor="#CC9900";

//18-19 night

if (hours > 17 && hours < 20){

document.write ('<body style="background-color: orange">');

}

//20-21 night

else if (hours > 19 && hours < 22){

document.write ('<body style="background-color: orangered">');

}

//22-4 night

else if (hours > 21 || hours < 5){

document.write ('<body style="background-color: #C0C0C0;">');

}

//9-17 day

else if (hours > 8 && hours < 18){

document.write ('<body style="background-color: #616D7E">');

}

//7-8 day

else if (hours > 6 && hours < 9){

document.write ('<body style="background-color: skyblue">');}

//5-6 day

else if (hours > 4 && hours < 7){

document.write ('<body style="background-color: steelblue">');

}

else {

document.write ('<body style="background-color: white">');

}

</script

**26. How will you sort an array in perl? What is the purpose of next statement?**

The sort function sorts each element of an array according to the ASCII Numeric standards. This function has the following syntax −

**sort [ SUBROUTINE ] LIST**

This function sorts the LIST and returns the sorted array value. If SUBROUTINE is specified then specified logic inside the SUBTROUTINE is applied while sorting the elements.

*#!/usr/bin/perl*

*# define an array*

@foods = qw(pizza steak chicken burgers); **print** "Before: @foods\n";

*# sort this array*

@foods = sort(@foods); **print** "After: @foods\n";

This will produce the following result −

**Before**: pizza steak chicken burgers

**After**: burgers chicken pizza steak

**next:** It causes the loop to skip the remainder of its body and immediately retest its condition prior to reiterating. last statement.

**27. What is the purpose of −> operator? Write a program that generates random integers between 1 and 10 using perl.**

The arrow operator is mostly used in dereferencing a method or variable from an object or a class name.

Example: Obj - > a is an example to access variable $a from object $obj.

If you want to make sure your random number also has a lower limit, you'll have to take care of this manually, but it's simple also.

For example, let's assume you need a random number that is greater than or equal to 1, but less than or equal to 10. This Perl random code will do the trick:

**my $random\_number = int(rand(10)) + 1;**

**print $random\_number, "\n";**

The Perl rand function returns a number between 0 and 9, so by adding 1 to that result, we will get a number that is greater than or equal to 1 and less than or equal to 10.

Or you can do like below.

**$lower\_limit = 1;**

**$upper\_limit = 11;**

**my $random\_number = int(rand($upper\_limit-$lower\_limit)) + $lower\_limit;**

**print $random\_number, "\n";**

**28.Write a program that prints the elements of a list using perl. What are Hashes in perl?**

Refer:<https://www.tutorialspoint.com/perl/perl_arrays.htm>

**Hashes:** Hashes are unordered sets of key/value pairs that you access using the keys as subscripts. They are preceded by a percent sign .

**29. Design an arithmetic calculator using JavaScript and html.**

<html>

<head>

<title>Simple Javascript Calculator - Basic Arithmetic Operations</title>

<!-- Aim: Write HTML Code Using JavaScript Functions To Perform Basic Arithmetic Operations. -->

<!-- 1. Take Two numbers from user say 'Number 1' and 'Number 2'. -->

<!-- 2. Perform Addition, Subtraction, Multiplication, Division and Modulus. -->

<!-- 3. Result must be displayed on same HTML Page when respective button is clicked. -->

<!-- 4. Use <input> tag (HTML Forms Concept) with onclick.-->

<!-- 5. Call individual Javascript Function, put them inside <head> tag only.-->

<!-- 6. Javascript Tutorial/Code For Computer Science Students. -->

<!-- 7. Tested and Written By (c) Gaurav Akrani. -->

<script language="javascript" type="text/javascript">

function multiply(){

a=Number(document.calculator.number1.value);

b=Number(document.calculator.number2.value);

c=a\*b;

document.calculator.total.value=c;

}

</script>

<script language="javascript" type="text/javascript">

function addition(){

a=Number(document.calculator.number1.value);

b=Number(document.calculator.number2.value);

c=a+b;

document.calculator.total.value=c;

}

</script>

<script language="javascript" type="text/javascript">

function subtraction(){

a=Number(document.calculator.number1.value);

b=Number(document.calculator.number2.value);

c=a-b;

document.calculator.total.value=c;

}

</script>

<script language="javascript" type="text/javascript">

function division(){

a=Number(document.calculator.number1.value);

b=Number(document.calculator.number2.value);

c=a/b;

document.calculator.total.value=c;

}

</script>

<script language="javascript" type="text/javascript">

function modulus(){

a=Number(document.calculator.number1.value);

b=Number(document.calculator.number2.value);

c=a%b;

document.calculator.total.value=c;

}

</script>

</head>

<body>

<!-- Opening a HTML Form. -->

<form name="calculator">

<!-- Here user will enter 1st number. -->

Number 1: <input type="text" name="number1">

<!-- Here user will enter 2nd number. -->

Number 2: <input type="text" name="number2">

<!-- Here result will be displayed. -->

Get Result: <input type="text" name="total">

<!-- Here respective button when clicked, calls only respective artimetic function. -->

<input type="button" value="ADD" onclick="javascript:addition();">

<input type="button" value="SUB" onclick="javascript:subtraction();">

<input type="button" value="MUL" onclick="javascript:multiply();">

<input type="button" value="DIV" onclick="javascript:division();">

<input type="button" value="MOD" onclick="javascript:modulus();">

</form>

</body>

</html>

**30. Describe the methods used to display something in webpage in JavaScript.**

JavaScript can "display" data in different ways:

* Writing into an HTML element, using innerHTML.
* Writing into the HTML output using document.write().
* Writing into an alert box, using window.alert().
* Writing into the browser console, using console.log().

**Using innerHTML**

To access an HTML element, JavaScript can use the document.getElementById(id) method.

The id attribute defines the HTML element. The innerHTML property defines the HTML content:

Example

<!DOCTYPE html>

<html>

<body>

<h1>My First Web Page</h1>

<p>My First Paragraph</p>

<p id="demo"></p>

<script>

document.getElementById("demo").innerHTML = 5 + 6;

</script>

</body>

</html>

**Using document.write()**

For testing purposes, it is convenient to use document.write():

<!DOCTYPE html>  
<html>  
<body>  
  
<h1>My First Web Page</h1>  
<p>My first paragraph.</p>  
  
<script>  
document.write(5 + 6);  
</script>  
  
</body>  
</html>

**Using window.alert()**

You can use an alert box to display data:

Example

<!DOCTYPE html>

<html>

<body>

<h1>My First Web Page</h1>

<p>My first paragraph.</p>

<script>

window.alert(5 + 6);

</script>

</body>

</html>

**Using console.log()**

For debugging purposes, you can use the **console.log()** method to display data.

Example

<!DOCTYPE html>

<html>

<body>

<script>

console.log(5 + 6);

</script>

</body>

</html>

**30. Describe the methods used to display something in webpage.**

The write() method writes HTML expressions or JavaScript code to a document.

The write() method is mostly used for testing: If it is used after an HTML document is fully loaded, it will delete all existing HTML.

**Example:**

**<!DOCTYPE html>**

**<html>**

**<body>**

**<script>**

**document.write("Hello World! <br>");**

**document.write("Have a nice day!");**

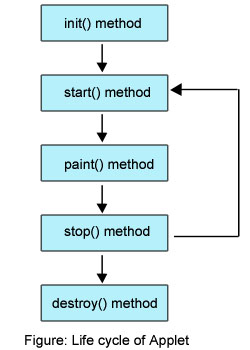
**</script>**

**</body>**

**</html>**

**31. Explain the life cycle of an Applet indicating the functions**

**Applet Life Cycle**



**Brief Description of Life Cycle Methods**

**Following is the brief description of the above methods.**

init(): The applet's voyage starts here. In this method, the applet object is created by the browser. Because this method is called before all the other methods, programmer can utilize this method to instantiate objects, initialize variables, setting background and foreground colors in GUI etc.; the place of a constructor in an application. It is equivalent to born state of a thread.

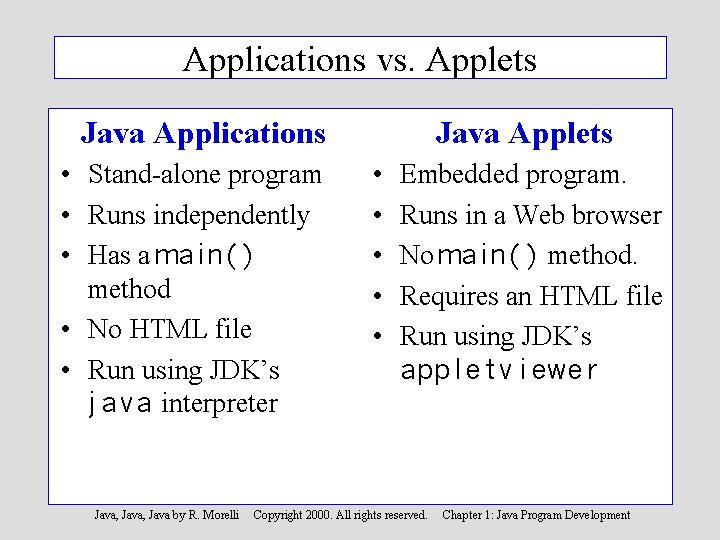
start(): In init() method, even through applet object is created, it is in inactive state. An inactive applet is not eligible for microprocessor time even though the microprocessor is idle. To make the applet active, the init() method calls start() method. In start() method, applet becomes active and thereby eligible for processor time.

paint(): This method takes a java.awt.Graphics object as parameter. This class includes many methods of drawing necessary to draw on the applet window. This is the place where the programmer can write his code of what he expects from applet like animation etc. This is equivalent to runnable state of thread.

stop(): In this method the applet becomes temporarily inactive. An applet can come any number of times into this method in its life cycle and can go back to the active state (paint() method) whenever would like. It is the best place to have cleanup code. It is equivalent to the blocked state of the thread.

destroy(): This method is called just before an applet object is garbage collected. This is the end of the life cycle of applet. It is the best place to have cleanup code. It is equivalent to the dead state of the thread.

**32. What is the difference between Java applets and Java application programs?**



**33. List any three attributes of Applet tag used in HTML. Explain the purpose of these attributes.**

**https://www.tutorialspoint.com/html/html\_applet\_tag.htm**

**34. What is a prompt box? Explain the working of timers in JavaScript? Also elucidate the drawbacks of using the timer, if any? (2+2+1)**

* The **promp**t() method displays a dialog box that prompts the visitor for input.

A prompt box is often used if you want the user to input a value before entering a page.

Note: When a prompt box pops up, the user will have to click either "OK" or "Cancel" to proceed after entering an input value. Do not overuse this method, as it prevents the user from accessing other parts of the page until the box is closed.

The prompt() method returns the input value if the user clicks "OK". If the user clicks "cancel" the method returns null.

* Timers are used to execute a piece of code at a set time or also to repeat the code in a given interval of time. This is done by using the functions **setTimeout, setInterval**and**clearInterval**.

The **setTimeout(function, delay)** function is used to start a timer that calls a particular function after the mentioned delay. The **setInterval(function, delay)** function is used to repeatedly execute the given function in the mentioned delay and only halts when cancelled. The **clearInterval(id)** function instructs the timer to stop.

* Timers are operated within a single thread, and thus events might queue up, waiting to be executed.

**35. Explain the difference between "==" and "==="?What are all the types of Pop up boxes available in JavaScript? What is the use of Void(0)? (2+2+1)**

1. "==" checks only for equality in value whereas "===" is a stricter equality test and returns false if either the value or the type of the two variables are different.
2. The types of Pop up boxes available in JavaScript are:
   * Alert
   * Confirm and
   * Prompt
3. Void(0) is used to prevent the page from refreshing and parameter "zero" is passed while calling.Void(0) is used to call another method without refreshing the page.

**36. Explain what is pop()method in JavaScript? What are JavaScript Cookies? (3+2)**

* The pop() method is similar as the shift() method but the difference is that the Shift method works at the start of the array. Also the pop() method take the last element off of the given array and returns it. The array on which is called is then altered.

Example:

var cloths = ["Shirt", "Pant", "TShirt"];

cloths.pop();

//Now cloth becomes Shirt,Pant

* Cookies are the small test files stored in a computer and it gets created when the user visits the websites to store information that they need. Example could be User Name details and shopping cart information from the previous visits

**37. Mention what is the disadvantage of using inner HTML in JavaScript? What is the use of Push method in JavaScript? (3+2)**

If you use innerHTML in JavaScript the disadvantage is

* Content is replaced everywhere
* We cannot use like "appending to innerHTML"
* Even if you use +=like "innerHTML = innerHTML + 'html'" still the old content is replaced by html
* The entire innerHTML content is re-parsed and build into elements, therefore its much slower
* The innerHTML does not provide validation and therefore we can potentially insert valid and broken HTML in the document and break it

The push method is used to add or append one or more elements to the end of an Array. Using this method, we can append multiple elements by passing multiple arguments

**38. How are DOM utilized in JavaScript? Display your name using JavaScript alert box. (2+3)**

DOM stands for Document Object Model and is responsible for how various objects in a document interact with each other. DOM is required for developing web pages, which includes objects like paragraph, links, etc. These objects can be operated to include actions like add or delete. DOM is also required to add extra capabilities to a web page. On top of that, the use of API gives an advantage over other existing models.

<h1>My First Web Page</h1>

<p>My first paragraph.</p>

<script>

window.alert(‘Sudeshna’);

</script>

</body>

</html>

**39. Write about the errors shown in JavaScript? How are JavaScript and ECMA Script related?**

JavaScript gives a message if it encounters an error. The recognized errors are -

* Load-time errors: The errors shown at the time of the page loading are counted under Load-time errors. These errors are encountered by the use of improper syntax, and thus are detected while the page is getting loaded.
* Run-time errors: This is the error that comes up while the program is running. It is caused by illegal operations, for example, division of a number by zero, or trying to access a non-existent area of the memory.
* Logic errors: It is caused by the use of syntactically correct code, which does not fulfill the required task. For example, an infinite loop.

ECMA Script are like rules and guideline while Javascript is a scripting language used for web development.

**40.How to merge two array in perl? Name two the prefix dereferencer in perl?**

Because an array is just a comma-separated sequence of values, you can combine them together as shown below.

*#!/usr/bin/perl*

@numbers = (1,3,(4,5,6));

**print** "numbers = @numbers\n";

This will produce the following result −

numbers = 1 3 4 5 6

Hint: To dereference a reference simply use $, @ or % as prefix of the reference variable depending on whether the reference is pointing to a scalar, array, or hash.

**41.What is the difference between for & foreach? What is eval in perl?**

<https://stackoverflow.com/questions/2279471/whats-the-difference-between-for-and-foreach-in-perl>

eval: eval in all its forms is used to execute a little Perl program, trapping any errors encountered so they don't crash the calling program.

**42. Write a perl program to remove duplicate lines from a file.**

<https://www.perlmonks.org/?node_id=198959>

**43. Why we use Perl? Explain Perl regular expression.**

Perl is a general-purpose programming language originally developed for text manipulation and now used for a wide range of tasks including system administration, web development, network programming, GUI development, and more.

A regular expression is a string of characters that defines the pattern or patterns you are viewing. The syntax of regular expressions in Perl is very similar to what you will find within other regular expression.supporting programs, such as sed, grep, and awk.

The basic method for applying a regular expression is to use the pattern binding operators =~ and !~. The first operator is a test and assignment operator.

There are three regular expression operators within Perl.

* Match Regular Expression - m//
* Substitute Regular Expression - s///
* Transliterate Regular Expression - tr///

The forward slashes in each case act as delimiters for the regular expression (regex) that you are specifying. If you are comfortable with any other delimiter, then you can use in place of forward slash.

**44. What is the difference between chop & chomp functions in perl? Write a perl script to validate email address.**

chop() removes the last character from a scalar value.

chomp() checks whether the last characters of a string or list of strings match the input line separator defined by the $/ system variable. If they do, chomp removes them.

**For details:**<https://www.linuxnix.com/perl-difference-between-chop-and-chomp-functions-explained/>

Assuming $email\_address holds the address to be checked, you can check its validity using:

#!/usr/bin/perl

use Email::Valid

$email\_address = 'me@@example.com';

if (Email::Valid->address($email\_address)) {

# The email address is valid

} else {

# The email address is not valid

}

You can also have Email::Valid check for valid top-level domains (making sure ".com", ".net", ".cn" or another valid domain name is at the email address's very end). Make sure the Net::Domain::TLD module is installed.

#!/usr/bin/perl

use Email::Valid

$email\_address = 'me@@example.com';

if (Email::Valid->address(-address => $email\_address,

-tldcheck => 1)) {

# The email address is valid

} else {

# The email address is not valid

}

45. How to get Hash size in perl. How to add or remove elements in Hashes. How many loop is supported by perl.

To get the size of a Perl hash (the Perl hash size), use the Perl "keys" function, and assign it to a scalar value, like this:

**$size = keys %my\_hash;**

The variable $size will now contain the number of keys in your Perl hash, which is the size of the hash, i.e., the total number of key/value pairs in the hash.

Adding a new key/value pair can be done with one line of code using simple assignment operator.

*#!/usr/bin/perl*

%data = ('John Paul' => 45, 'Lisa' => 30, 'Kumar' => 40); @keys = keys %data;  
$size = @keys;  
**print** "1 - Hash size: is $size\n";

*# adding an element to the hash;*

$data{'Ali'} = 55;  
@keys = keys %data;  
$size = @keys;  
**print** "2 - Hash size: is $size\n";

This will produce the following result −

1 - **Hash** size: **is** 3

2 - **Hash** size: **is** 4

To remove an element from the hash you need to use delete function as shown below in the example−

*#!/usr/bin/perl*

%data = ('John Paul' => 45, 'Lisa' => 30, 'Kumar' => 40); @keys = keys %data;  
$size = @keys;  
**print** "1 - Hash size: is $size\n";

*# delete the same element from the hash;*

**delete** $data{'John Paul'};  
@keys = keys %data;  
$size = @keys;  
**print** "2 - Hash size: is $size\n";

This will produce the following result −

1 - **Hash** size: **is** 3

2 - **Hash** size: **is** 2

**Loop Supported:**

**while loop**

**until loop**

**for loop**

**foreach loop**

**do… while loop**

**nested loop**

* + 1. **Create an html page to explain the use of various predefined functions of string and math object in java script.**

<!DOCTYPE html>

<html>

<body>

<h2>JavaScript Math Constants</h2>

<p id="demo"></p>

<script>

document.getElementById("demo").innerHTML =

"<p><b>Math.E:</b> " + Math.E + "</p>" +

"<p><b>Math.PI:</b> " + Math.PI + "</p>" +

"<p><b>Math.SQRT2:</b> " + Math.SQRT2 + "</p>" +

"<p><b>Math.SQRT1\_2:</b> " + Math.SQRT1\_2 + "</p>" +

"<p><b>Math.LN2:</b> " + Math.LN2 + "</p>" +

"<p><b>Math.LN10:</b> " + Math.LN10 + "</p>" +

"<p><b>Math.LOG2E:</b> " + Math.LOG2E + "</p>" +

"<p><b>Math.Log10E:</b> " + Math.LOG10E + "</p>";

</script>

</body>

</html>

<!DOCTYPE html>

<html>

<body>

<h2>JavaScript String Properties</h2>

<p>The length property returns the length of a string:</p>

<p id="demo"></p>

<script>

var txt = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";

document.getElementById("demo").innerHTML = txt.length;

</script>

</body>

</html>

**MODULE 1 &2**

**1. Explain the various field of TCP header and the working principle of the TCP protocol.**

<https://www.tutorialspoint.com/data_communication_computer_network/transmission_control_protocol.htm>

**2.Define IGMP, ICMP ,ARP and RARP. (5+5+3+2)**

**IGMP**: Internet Group Management Protocol is a group management [protocol](http://ecomputernotes.com/computernetworkingnotes/computer-network/protocol) that mainly manages the group membership in a multicast network.

* In a multicast network, multicast routers are used to route packets to all the computers that are having membership of a particular group.
* The multicast routers use the [information](http://ecomputernotes.com/fundamental/information-technology/what-do-you-mean-by-data-and-information) from IGMP to determine which hosts are having membership of which group.
* A multicast router generally receives thousands of multicast packets that have to be transmitted to various groups. If a router has no knowledge about the group membership, it will broadcast packet to every host and this will increase the load on the network.
* In order to save the network from such a problem, a list of groups IS maintained when members of the group are present in the network.
* Thus, IGMP helps the multicast router to create and update this list.

This protocol uses three different messages: query message, membership report and leave report.

**ICMP**: <https://www.geeksforgeeks.org/internet-control-message-protocol-icmp/>

**ARP and RARP**: https://www.geeksforgeeks.org/computer-network-arp-reverse-arprarp-inverse-arpinarp-proxy-arp-gratuitous-arp/

3. **Explain and draw the header format of IPv4 and explain DHCP. (10+5)**

<https://www.geeksforgeeks.org/network-layer-introduction-ipv4/>

**DHCP:** DHCP is a Dynamic Host Configuration Protocol used to provide the IP Address dynamically works at the Application layer in the under the TCP/IP Protocols.

DHCP assigns an IP address when a system is started, for example:

* A user turns on a computer with a DHCP client.
* The client computer sends a broadcast request (called a DISCOVER), looking for a DHCP server to answer.
* The router directs the DISCOVER packet to the correct DHCP server.
* The server receives the DISCOVER packet. Based on availability and usage policies set on the server, the server determines an appropriate address (if any) to give to the client. The server then temporarily reserves that address for the client and sends back to the client an OFFER packet, with that addressinformation. The server also configures the client's DNS servers, WINS servers, NTP servers, and sometimes other services as well.
* The client sends a REQUEST packet, letting the server know that it intends to use the address.
* The server sends an ACK packet, confirming that the client has a been given a lease on the address for a server-specified period of time.

4. **Explain the detail of Web architecture. 15**

<http://www.daniloaz.com/en/what-is-web-architecture/>

**5. What is IP addressing? How it is classified? How is subnet addressing is performed?**

<http://www.certiology.com/computing/computer-networking/ip-addresses-subnet-mask-vlsm-and-supernetting-tutorial-for-dummies.html>

**6. Write short notes on any three of the following: 3\*5**

**a. DNS**

**b. POP**

**c. SMTP**

**d. FTP**

**DNS:** Refer Question No 16 & 17 in 5 marks question.

**POP**: Post Office Protocol (POP) is a type of computer networking and Internet standard protocol that extracts and retrieves email from a remote mail server for access by the host machine.

POP is an application layer protocol in the OSI model that provides end users the ability to fetch and receive email. Post Office Protocol is the primary protocol behind email communication. POP works through a supporting email software client that integrates POP for connecting to the remote email server and downloading email messages to the recipient’s computer machine.

POP uses the TCP/IP protocol stack for network connection and works with Simple Mail Transfer Protocol (SMTP) for end-to-end email communication, where POP pulls messages and SMTP pushes them to the server. As of 2012, Post Office Protocol is in its third version known as POP 3 and is commonly used in most email client/server communication architecture.

**SMTP**: SMTP is one of the most common and popular protocols for email communication over the Internet and it provides intermediary network services between the remote email provider or organizational email server and the local user accessing it.

SMTP is generally integrated within an email client application and is composed of four key components:

1. Local user or client-end utility known as the mail user agent (MUA)
2. Server known as mail submission agent (MSA)
3. Mail transfer agent (MTA)
4. Mail delivery agent (MDA)

SMTP works by initiating a session between the user and server, whereas MTA and MDA provide domain searching and local delivery services.

For Details : <https://www.geeksforgeeks.org/simple-mail-transfer-protocol-smtp/>

**FTP**: <https://www.geeksforgeeks.org/computer-network-file-transfer-protocol-ftp/>

**7. Differentiate between routers and bridge? State there working principle? (8+7)**

Differentiate between routers and bridge: <https://techdifferences.com/difference-between-bridge-and-router.html>

How Router works: <https://searchnetworking.techtarget.com/tip/How-routers-work>

How bridge works : <http://freewimaxinfo.com/network-bridges.html>

**8. a) What is IP datagram ? Draw and explain the IPV4 datagram format. (3+6)**

**b) A block of address is granted to a small organization. One of the address is 205.16.37.39/28. Find the first and last address in the block. 6**

* 1. <https://www.geeksforgeeks.org/network-layer-introduction-ipv4/>
  2. The binary representation of the given address is

11001101 00010000 00100101 00100111

If we set 32−28 rightmost bits to 0, we get

11001101 00010000 00100101 0010000

or   
205.16.37.32 (First Address)

The binary representation of the given address is

11001101 00010000 00100101 00100111

If we set 32 − 28 rightmost bits to 1, we get

11001101 00010000 00100101 00101111

or

205.16.37.47 (last address)

9. **What is IPV6? Explain its advantage over IPV4. Also explain its frame format.**

Internet Protocol version 6 is a new addressing protocol designed to incorporate all the possible requirements of future Internet known to us as Internet version 2. This protocol as its predecessor IPv4, works on the Network Layer (Layer-3). Along with its offering of an enormous amount of logical address space, this protocol has ample features to which address the shortcoming of IPv4.

* [IPv4 addresses](http://www.omnisecu.com/tcpip/internet-layer-ip-addresses.php) are 32 bit length where as [IPv6 addresses](http://www.omnisecu.com/tcpip/ipv6/introduction-to-ipv6-addressing.php) are 128 bit length.
* [IPv4 addresses](http://www.omnisecu.com/tcpip/internet-layer-ip-addresses.php) are [binary numbers](http://www.omnisecu.com/tcpip/binary-decimal-hexadecimal-numbers-and-conversions.php) represented in decimals and [IPv6 addresses](http://www.omnisecu.com/tcpip/ipv6/introduction-to-ipv6-addressing.php) are [binary numbers](http://www.omnisecu.com/tcpip/binary-decimal-hexadecimal-numbers-and-conversions.php) represented in [hexadecimals](http://www.omnisecu.com/tcpip/binary-decimal-hexadecimal-numbers-and-conversions.php).
* [Checksum field](http://www.omnisecu.com/tcpip/internet-layer.php) is available in [IPv4 header and](http://www.omnisecu.com/tcpip/internet-layer.php)no checksum field in [IPv6 header](http://www.omnisecu.com/tcpip/ipv6/ipv6-datagram-header-format.php).
* [Broadcast messages](http://www.omnisecu.com/cisco-certified-network-associate-ccna/unicast-multicast-broadcast.php) are available in IPv4. [Broadcast messages](http://www.omnisecu.com/cisco-certified-network-associate-ccna/unicast-multicast-broadcast.php) are not available in IPv6. Instead a link-local scope "All nodes" [multicast IPv6 address](http://www.omnisecu.com/tcpip/ipv6/multicast-ipv6-addresses.php) is used for broadcast similar functionality.
* Manual configuration (Static) of [IPv4 addresses](http://www.omnisecu.com/tcpip/internet-layer-ip-addresses.php) or DHCP (Dynamic configuration) is required to configure [IPv4 addresses](http://www.omnisecu.com/tcpip/internet-layer-ip-addresses.php).Auto-configuration of addresses is available in IPv6.

[https://www.geeksforgeeks.org/computer-network-internet-protocol-version-6-ipv6 -header/](https://www.geeksforgeeks.org/computer-network-internet-protocol-version-6-ipv6%20-header/)

(For frame format)

10. **In cases where reliability is not of primary importance, UDP would make a good transport protocol. Give examples of specific cases. What are the responsibilities of the network layer in the Internet model ?** (8+7)

<https://www.chegg.com/homework-help/tcp-ip-protocol-suite-4th-edition-chapter-14-solutions-9780073376042>

The network layer is the third layer from the bottom in the OSI (Open Systems Interconnection) seven layer model.Also called the OSI reference model, this model was originally developed in 1977 in order to standardize and simplify definitions with regard to computer [networks](http://www.linfo.org/network.html). It divides the networking process into seven logical layers, starting at the physical level (i.e., cable and network interface cards) and ascending to the application level (i.e., the layer that interfaces with application programs on computers), specifying services and protocols for each layer.

The network layer is the layer at which IP (Internet protocol) operates. Other protocols in the TCP/IP suite of protocols, which forms the basis of the Internet and most other networks that also operate in this layer are ICMP, IPsec, ARP, RIP, OSPF and BGP.

The network layer is responsible for routing, which is moving [packets](http://www.linfo.org/packet.html) (the fundamental unit of data transport on modern computer networks) across the network using the most appropriate paths. It also addresses messages and translates *logical addresses* (i.e., IP addresses) into *physical addresses* (i.e., [MAC addresses](http://www.linfo.org/mac_address.html)).

This contrasts with the *data link layer* below it, which is responsible for the device-to-device delivery of packets using MAC addresses. Above the network layer is the transport layer, which is responsible for making certain that packets are delivered in sequence and without errors, loss or duplication.

**11. a) What is JavaScript? State the difference between JavaScript and Java. How to develop JavaScript? Explain with example.**

**b) Write a java script code to verify authenticity of EMAIL ADDRESS in a given text box.**  (2+3+5+5)

a) JavaScript is a lightweight, interpreted programming language with object-oriented capabilities that allows you to build interactivity into otherwise static HTML pages.

The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

|  |  |
| --- | --- |
| JAVA | JAVASCRIPT |
| Java is strongly typed language and variable must be declare first to use in program. In Java the type of a variable is checked at compile-time. | JavaScript is weakly typed language and have more relaxed syntax and rules. |
| Java is an object oriented programming language. | JavaScript is an object based scripting language. |
| Java applications can run in any virtual machine (JVM) or browser. | JavaScript code run on browser only as JavaScript is developed for browser only. |
| Objects of Java are class based even we can’t make any program in java without creating a class. | JavaScript Objects are prototype based. |
| Java program has file extension “.Java” and translates source code into bytecodes which is executed by JVM (Java Virtual Machine). | JavaScript file has file extension “.js” and it is interpreted but not compiled,every browser has the JavaScript interpreter to execute JS code. |
| Java is a Standalone language. | Contained within a web page and integrates with its HTML content. |

<!DOCTYPE html>

<html>

<body>

<h2>What Can JavaScript Do?</h2>

<p id="demo">JavaScript can change HTML content.</p>

<button type="button" onclick='document.getElementById("demo").innerHTML = "Hello JavaScript!"'>Click Me!</button>

</body>

</html>

**b) We can validate the email by the help of JavaScript.**

**There are many criteria that need to be follow to validate the email id such as:**

* + **email id must contain the @ and . character**
  + **There must be at least one character before and after the @.**
  + **There must be at least two characters after . (dot).**

**Let's see the simple example to validate the email field.**

<script>

functionvalidateemail()

{

var x=document.myform.email.value;

varatposition=x.indexOf("@");

vardotposition=x.lastIndexOf(".");

if (atposition<1 || dotposition<atposition+2 || dotposition+2>=x.length){

alert("Please enter a valid e-mail address \n atpostion:"+atposition+"\n dotposition:"+dotposition);

return false;

}

}

</script>

<body>

<form name="myform" method="post" action="#" onsubmit="return validateemail();">

Email: <input type="text" name="email"><br/>

<input type="submit" value="register">

</form>

**12. a) List the various dialog boxes in Java Script.**

**b) Mention the various Java Script object models.**

**c) Write a JavaScript to display a welcome button of an html form is pressed. (5+5+5)**

**a) JavaScript supports three important types of dialog boxes.**

**Alert Dialog Box**

An alert dialog box is mostly used to give a warning message to the users. For example, if one input field requires to enter some text but the user does not provide any input, then as a part of validation, you can use an alert box to give a warning message. Alert box gives only one button "OK" to select and proceed.

**Confirmation Dialog Box**

A confirmation dialog box is mostly used to take user's consent on any option. It displays a dialog box with two buttons: Cancel.

If the user clicks on the OK button, the window method confirm() will return true. If the user clicks on the Cancel button, then confirm() returns false. You can use a confirmation dialog box as follows.

**Prompt Dialog Box**

The prompt dialog box is very useful when you want to pop-up a text box to get user input. Thus, it enables you to interact with the user. The user needs to fill in the field and then click OK.

This dialog box is displayed using a method called prompt() which takes two parameters: (i) a label which you want to display in the text box and (ii) a default string to display in the text box.

This dialog box has two buttons: OK and Cancel. If the user clicks the OK button, the window method prompt() will return the entered value from the text box. If the user clicks the Cancel button, the window method prompt() returns null.

b) Every web page resides inside a browser window which can be considered as an object.

A Document object represents the HTML document that is displayed in that window. The Document object has various properties that refer to other objects which allow access to and modification of document content.

The way a document content is accessed and modified is called the Document Object Model, or DOM. The Objects are organized in a hierarchy. This hierarchical structure applies to the organization of objects in a Web document.

Window object − Top of the hierarchy. It is the outmost element of the object hierarchy.

Document object − Each HTML document that gets loaded into a window becomes a document object. The document contains the contents of the page.

Form object − Everything enclosed in the <form>...</form> tags sets the form object.

Form control elements − The form object contains all the elements defined for that object such as text fields, buttons, radio buttons, and checkboxes.

<!DOCTYPE html>

<html>

<body>

<h2>What Can JavaScript Do?</h2>

<p id="demo">JavaScript can change HTML content.</p>

<button type="button" onclick='document.getElementById("demo").innerHTML = "Hello JavaScript!"'>Click Me!</button>

</body>

</html>

**13. a) How scripting language is differs from HTML.**

**b) Define function in Java Script with example.**

**c)Write the complete JavaScript to prompt the user for the radius of the sphere and call function sphere Volume to calculate and display the volume of the sphere. Use thestatement. Volume=(4.0/3.0)\*Math.PI\*Math.pow(radius,3).**

**(4+5+6)**

a) HTML is actually a markup language and not a scripting language.

Scripting implies decision making capabilities (the code can actually evaluate and take an action based on what it finds) – PHP, PERL, Ruby, Javascript are examples of scripting languages.

Markup languages create structure for a document … they only describe data. For example: HTML, XHTML, XML

b) Code can be reused: Define the code once, and use it many times. The same code many times with different arguments, to produce different results.

<!DOCTYPE html>

<html>

<body>

<h2>JavaScript Functions</h2>

<p>This example calls a function to convert from Fahrenheit to Celsius:</p>

<p id="demo"></p>

<script>

functiontoCelsius(f) {

return (5/9) \* (f-32);

}

document.getElementById("demo").innerHTML = toCelsius(77);

</script>

</body>

</html>

c)

**HTML Code:**

<!doctype html>

<html lang="en">

<head>

<meta charset="utf-8">

<title>Volume of a Sphere</title>

<style>

body{padding-top:30px;}

label,input{display:block;}

</style>

</head>

<body>

<p>Input radius value and get the volume of a sphere.</p>

<form action="" method="post" id="MyForm">

<label for="radius">Radius</label><input type="text" name="radius" id="radius" required>

<label for="volume">Volume</label><input type="text" name="volume" id="volume">

<input type="submit" value="Calculate" id="submit"></form>

</body>

</html>

**JavaScript Code:**

functionvolume\_sphere()

{

var volume;

var radius = document.getElementById('radius').value;

radius = Math.abs(radius);

volume = (4/3) \* Math.PI \* Math.pow(radius, 3);

volume = volume.toFixed(4);

document.getElementById('volume').value = volume;

return false;

}

window.onload = document.getElementById('MyForm').onsubmit = volume\_sphere;

**14. a) Explain the various event handlers in java script. Give an example of each.**

**b) Develop a JavaScript program to display a message “HI ! GOOD MORNING TO YOU “when a page is loaded and displays a message “THANKS TO VISIT OUR WEB PAGE” when a page is unloaded.**  (8+7)

Event Handlers:

|  |  |
| --- | --- |
| onclick: | Use this to invoke JavaScript upon clicking (a link, or form boxes) |
| onload: | Use this to invoke JavaScript after the page or an image has finished loading. |
| onmouseover: | Use this to invoke JavaScript if the mouse passes by some link |
| onmouseout: | Use this to invoke JavaScript if the mouse goes pass some link |
| onunload: | Use this to invoke JavaScript right after someone leaves this page. |

<script>

function inform(){

    alert("You have activated me by clicking the grey button! Note that the event handler is added within the event that it handles, in this case, the form button event tag")

}

</script>

<form>

<input type="button" name="test" value="Click me" **onclick**="inform()">

</form>

<html>

<head><title>Body onload example</title>

</head>

<body **onload**="alert('This page has finished loading!')">

Welcome to my page

</body>

</html>

**<a href="blabla.htm"onmouseover="status='DHTML code library!';return true"onmouseout="status=' '">Dynamic Drive</a>**

<body **onunload**="alert('Thank you. Please come back to this site and visit us soon, ok?')">

<html>

<head>

<script type="text/JavaScript">

function load() {

alert("HI ! GOOD MORNING TO YOU");

}

function unload(){

alert("THANKS TO VISIT OUR WEB PAGE");

}

</script>

</head>

<body onLoad="load()" onUnload="unload()">

<!-- Webpage content goes here -->

</body>

</html>

**15. a) With an example describe java scripts Control structure.**

**b) Design a web page with a text box (username) where the user can enter a name and**

**Another text box (ID) where the user enter an only four digit ID.NO and a button “validate”. Validate the entered username and ID field for the following using java script.**

**· Both the fields should not be empty**

**· Name field should have alphabets**

**· ID field should have numeric. (7+8)**

<!DOCTYPE html>

<html>

<body>

<form action="/action\_pid.php" onsubmit="return myFunction()">

UserName (characters only): <input type="text" id="uname" size="20" name="uname"><br><br>

Id (4 digit numeric value): <input type="text" id="id" size="20" name="id"><br><br>

<input type="submit" value="Submit">

</form>

<script>

function myFunction() {

var id = document.getElementById("id").value;

var uname = document.getElementById("uname").value;

submitOK = "true";

if (uname.length <= 0 || id.length <= 0) {

alert("The name and id can not be empty");

submitOK = "false";

}

else

{

var letters = /^[A-Za-z]+$/;

if(!uname.match(letters))

{

alert('Please input alphabet characters only in username');

return false;

}

if (isNaN(id)) {

alert("The id contain numeric value only!!");

submitOK = "false";

}

else{

if (id.length != 4 ) {

alert("The id contain 4 digits only !!");

submitOK = "false";

}}

}

if (submitOK == "false") {

return false;

}

}

</script>

</body>

</html>

a) Conditional statements are used to perform different actions based on different conditions.

Very often when you write code, you want to perform different actions for different decisions.

In JavaScript we have the following conditional statements:

**Use if to specify a block of code to be executed, if a specified condition is true**

**Use else to specify a block of code to be executed, if the same condition is false**

**Use else if to specify a new condition to test, if the first condition is false**

**Use switch to specify many alternative blocks of code to be executed**

**Example:**

**<!DOCTYPE html>**

**<html>**

**<body>**

**<p>Click the button to get a time-based greeting:</p>**

**<button onclick="myFunction()">Try it</button>**

**<p id="demo"></p>**

**<script>**

**function myFunction() {**

**var greeting;**

**var time = new Date().getHours();**

**if (time < 10) {**

**greeting = "Good morning";**

**} else if (time < 20) {**

**greeting = "Good day";**

**} else {**

**greeting = "Good evening";**

**}**

**document.getElementById("demo").innerHTML = greeting;**

**}**

**</script>**

**</body>**

**16. a) What are Style Sheets? List down the ways of including style information in a document. Explain about types of cascading style sheet? Explain with example.**

A Style Sheet is a collection of style rules that that tells a browser how the various styles are to be applied to the HTML tags to present the document. Rules can be applied to all the basic HTML elements, for example the <p> tag, or you can define you own variation and apply them where you wish to.

**There are three types of Style Sheets:**

**Embedded**: the style rules are included within the HTML at the top of the Web page - in the head.

**Inline**: the style rules appear throughout the HTML of the Web page - i.e. in the body.

**Linked**: The style rules are stored in a separate file external to all the Web pages.

* CSS stands for Cascading Style Sheets
* CSS describes how HTML elements are to be displayed on screen, paper, or in other media
* CSS saves a lot of work. It can control the layout of multiple web pages all at once
* External stylesheets are stored in CSS files

**<!DOCTYPE html>**

**<html>**

**<head>**

**<style>**

**body {**

**background-color: lightblue;**

**}**

**h1 {**

**color: white;**

**text-align: center;**

**}**

**p {**

**font-family: verdana;**

**font-size: 20px;**

**}**

**</style>**

**</head>**

**<body>**

**<h1>My First CSS Example</h1>**

**<p>This is a paragraph.</p>**

**</body>**

**</html>**

**b) Design a webpage with a textbox where the user can enter a four digit number and button “validate”. Validate the entered number for the following using java script. No zeroes the first digit Entered number must be in ascending order of digits (Ex:1234,5678…).**

(7+8)

<!DOCTYPE html>

<html>

<body>

<p id="demo"></p>

<script>

function validate()

{

var cars=form1.demo.value;

vari = 0;

varlen = cars.length;

var text = "";

for (; i< len-1; i++) {

if(len!=4)

{

alert("length should be 4");

break;

}

else if(cars[0]==0)

{

alert("0 should not be first digit");

break;

}

else {

if(cars[i]>cars[i+1]){

alert("digits must be in ascending order");

break;}

}

}

if (len-1==i)

document.write(cars);

}

</script>

<form name="form1">

Enter a value:

<input type="text" id="demo">

<button type="submit" onclick=validate()>Submit</button></form>

</body>

</html>

**17. a) Write short notes on -**

**A) Java Script control statements**

**B) Advantages of Scripting**

**C) Java Script functions**

**(5+5+5)**

**A) Java Script control statements**

Conditional statements are used to perform different actions based on different conditions.

Very often when you write code, you want to perform different actions for different decisions.

In JavaScript we have the following conditional statements:

**Use if to specify a block of code to be executed, if a specified condition is true**

**Use else to specify a block of code to be executed, if the same condition is false**

**Use else if to specify a new condition to test, if the first condition is false**

**Use switch to specify many alternative blocks of code to be executed**

**Example:**

**<!DOCTYPE html>**

**<html>**

**<body>**

**<p>Click the button to get a time-based greeting:</p>**

**<button onclick="myFunction()">Try it</button>**

**<p id="demo"></p>**

**<script>**

**function myFunction() {**

**var greeting;**

**var time = new Date().getHours();**

**if (time < 10) {**

**greeting = "Good morning";**

**} else if (time < 20) {**

**greeting = "Good day";**

**} else {**

**greeting = "Good evening";**

**}**

**document.getElementById("demo").innerHTML = greeting;**

**}**

**</script>**

**</body>**

**B) Advantages of Scripting**

A scripting language is a form of programming language that is used to create scripts or bits of code. Scripting languages are often written to facilitate enhanced features of websites, these features are processed on the server but the script of a specific page runs on the user’s browser. The origin of the term was similar to its meaning in “a movie script tells actors what to do”: a scripting language controlled the operation of a normally-interactive program, giving it a sequence of work to do all in one batch. For instance, one could put a series of editing commands in a file, and tell an editor to run that “script” as if those commands had been typed interactively.

Advantages of scripting language

* + It’s easy to learn and use
  + Minimum programming knowledge or experience required
  + Allows complex tasks to be performed in relatively few steps
  + Allows simple creation and editing in a variety of task editors
  + Allows the addition of dynamic and interactive activities to web pages
  + The editing and running code is fast

**C) Java Script functions**

A JavaScript function is a block of code designed to perform a particular task. A JavaScript function is defined with the function keyword, followed by a name, followed by parentheses (). Function names can contain letters, digits, underscores, and dollar signs (same rules as variables). The parentheses may include parameter names separated by commas:

(parameter1, parameter2, ...)The code to be executed, by the function, is placed inside curly brackets: {}

function name(parameter1, parameter2, parameter3) {

code to be executed

}

Function parameters are listed inside the parentheses () in the function definition. Function arguments are the values received by the function when it is invoked. Inside the function, the arguments (the parameters) behave as local variables. JavaScript function is executed when "something" invokes it (calls it).

**18. Write JavaScript for the following. Provide a text box for the user enter user name. Validate the username for the no. of characters (assume some no. say 6). Provide a SUBMIT button for the validation to happen. On successful validation display a new page with an image and two text boxes for entering the width and height of the image respectively with a RESIZE button below. On clicking the Resize button validate the width and height numbers and on successful validation display the image with the requested width and height. (15)**

First page refer to question no. 15.

Second Page:

<!DOCTYPE html>

<html>

<body>

Width:

<input type="text" id="width"><br><br>

Height:

<input type="text" id="height"><br><br>

<br><br>

<img src="img\_girl.jpg" id="gl" alt="Girl in a jacket" width="100" height="100"><br>

<button onclick="myFunction()">Resize</button>

<script>

function myFunction() {

var myImg = document.getElementById("gl");

var x = document.getElementById("width").value;

var y = document.getElementById("height").value;

myImg.width=x;

myImg.height=y;

}

</script>

</body>

</html>

**19. a) Create an html page named as “validate\_registration.html”**

**A) Define a method name as “reset()” to be called when reset button is clicked and manually set all values of fields to default.**

**B) Define a method name as “check()” to be called when check button is clicked.**

**C) here check for blank entry, name, age, email, phone no, radio button, checkbox.**

**D) Once all the valuables are properly filled make the submit button to be visible.**

**E) Define the various fields in form using table.**

**(15)**

<html>

<script>

function reset1()

{

x=confirm("It will clear all the text entered")

if(x==true)

{

document.form1.t1.value=""

document.form1.t2.value=""

document.form1.ta.value=""

document.form1.t3.value=""

document.form1.r1[0].checked=false

document.form1.r1[1].checked=false

document.form1.c1.checked=false

document.form1.c2.checked=false

document.form1.c3.checked=false

document.form1.c4.checked=false

document.form1.c5.checked=false

document.form1.c6.checked=false

document.form1.t1.focus()

}

}

function check()

{

if((document.form1.t1.value=="")||(!(isNaN(document.form1.t1.value))))

{alert("please enter the correct name")

document.form1.t1.value=""

document.form1.t1.focus()

}

else if((document.form1.t2.value=="")||(isNaN(document.form1.t2.value)))

{

alert("please enter the age correctly")

document.form1.t2.value=""

document.form1.t2.focus()

}

else if(document.form1.t2.value>40)

{

alert("Sorry you age is beyound the limit")

document.form1.t2.value=""

document.form1.t2.focus()

}

else if(document.form1.ta.value=="")

{

alert("please enter the address")

document.form1.ta.focus()

}

else if((document.form1.r1[0].checked==false)&&(document.form1.r1[1].checked==false))

{

alert("please select the radio button")

document.form1.r1[0].focus()

}

else if((document.form1.c1.checked==false)&&(document.form1.c2.checked==false)&&(document.form1.c3.checked==false)&&(document.form1.c4.checked==false)&&(document.form1.c5.checked==false))

{

alert("please select the the languages known")

document.form1.c1.focus()

}

else if(document.form1.t3.value=="")

{

alert("please enter the password")

document.form1.t3.focus()

}

else if((document.form1.t1.value!="")&&(document.form1.t2.value!="")&&(document.form1.t3.value!="")&&(document.form1.ta.value!="")&&((document.form1.r1[0].checked!=false)||(document.form1.r1[0].checked!=false))&&((document.form1.c1.checked!=false)||(document.form1.c2.checked!=false)||(document.form1.c3.checked!=false)||(document.form1.c4.checked!=false)||(document.form1.c5.checked!=false)))

{

x=confirm("you have entered the datascorrectly,want to submit the form")

if(x)

{

document.lay.visibility="show"

}

}

}

</script>

<body bgcolor="lightblue" text="red" style="font-size:15pt;font-family:Garamond" onload=document.form1.t1.focus()><center>

<h2>ENTRY FORM</h2></center>

<form name=form1 method=post >

<table name=tab cellspacing=30pt>

<tr><td align=left><h2>Enter your Name :</h2></td><td align=right><input type=text name=t1 size=18>

<tr><td align=left><h2>Enter your Age :</h2></td><td align=right><input type=text name=t2 maxlength=3 size=18>

<tr><td align=left><h2>Enter your Address :</h2></td><td align=right><textarea name=ta rows=5 cols=15></textarea>

<tr><td align=left><h2>Sex :</h2></td><td align=left><input type=radio name=r1 value="female">Female<br>

<input type=radio name=r1 value=male>Male</td>

<tr><td align=left><h2>Languages Known :</h2></td><td align=left><center>(select more than one)</center>

<input type=checkbox name=c1 value=c>C<br>

<input type=checkbox name=c2 value=c++>C++<br>

<input type=checkbox name=c3 value=vb>VB<br>

<input type=checkbox name=c4 value=java>JAVA<br>

<input type=checkbox name=c5 value=asp>ASP<br>

<input type=checkbox name=c6 value=others>OTHERS<br></td>

<tr><td align=left><h2>Enter your Password :</h2></td><td align=right><input type=password name=t3 size=18>

</table><center>

<input type=button value=" reset "onClick=reset1()>

<input type=button value=" check "onClick=check()>

<h3>Before submitting the datas please click the check Button</h3>

<input type="submit" value=" submit "></center>

</form>

</body>

</html>

**20. a) How will you add an element to the beginning of an array?**

**b) Write an HTML/JavaScript code to take name as input through a confirm box and male or female from radio button and display Mr. or Mrs. And followed by user’s name.**

**(7+8)**

a) The unshift() method adds new items to the beginning of an array, and returns the new length.

Example

Add new items to the beginning of an array:

var fruits = ["Banana", "Orange", "Apple", "Mango"];

fruits.unshift("Lemon","Pineapple");

b)

<html>

<head>

<script LANGUAGE="JavaScript">

functionValidateForm(form){

ErrorText= "";

if ( ( form.gender[0].checked == false ) && ( form.gender[1].checked == false ) )

{

alert ( "Please choose your Gender: Male or Female" );

return false;

}

if ( form.gender[0].checked == true)

alert("Mr."+form.name.value);

if ( form.gender[1].checked == true)

alert("Mrs."+form.name.value);

}

</script>

</head>

<body>

<form name="feedback" action="#" method=post>

Name:<input type="text" name="name" ><br>

Your Gender: <input type="radio" name="gender" value="Male"> Male

<input type="radio" name="gender" value="Female"> Female

<input type="button" name="SubmitButton" value="Submit" onClick="ValidateForm(this.form)">

<input type="reset" value="Reset">

</form>

</body>

</html>

**21. a) Create an html page named as “Sorting.html”**

**A) Within the script tag**

**i. define a function called as “array\_size()” to get the size of array.**

**ii. define a function called as “get\_number()” to get numbers from user.**

**iii. define a function called as “Sorting()” to sort the numbers.**

**B) Within the body tag**

**i. Display the message to click the button & display a button to call the**

**ii. “array\_size()” method.**

**iii. “array\_size()” method calls “get\_number()” method which in turn calls the “sorting()” method. (15)**

<html>

<head>

<script type="text/javascript">

varnum=0;

number=0;

varnumarray=new Array();

functionarray\_size()

{

num=prompt("Enter how many number to be sorted","000");

number=parseInt(num);

get\_numbers();

}

functionget\_numbers()

{

if (number!=null && number!="")

{

for(i=0;i<number;i++)

{

n=prompt("Enter the number to be sorted","1");

numarray[i]=parseInt(n);

}

}

sorting()

}

function sorting()

{

document.writeln("<h1>Sorted Array<h1>");

document.writeln(numarray.sort(sortNumber));

}

functionsortNumber(a,b )

{

return a - b;

}

</script>

</head>

<body>

<h1> Click the button to get the Number sorted</h1>

<input type="button" onclick="array\_size()" value="Get Array Size" />

</body>

</html>

**22. a) Explain the following HTML tags with all attributes.**

**i) <a>(ii)<img> (iii)<table> (iv)<p>**

**b) Create an html page named as openwindow.html. Define a method called as openwin() which is to be called when a button is clicked. Within this method specify the necessary code to open a new window with some message as well as images.**

**(8+7)**

i) The <a> tag defines a hyperlink, which is used to link from one page to another.

The most important attribute of the <a> element is the href attribute, which indicates the link's destination.

By default, links will appear as follows in all browsers:

* + An unvisited link is underlined and blue
  + A visited link is underlined and purple
  + An active link is underlined and red

Example:

<a href="https://www.w3schools.com">Visit W3Schools.com!</a>

ii) The <img> tag defines an image in an HTML page.

The <img> tag has two required attributes: src and alt.

<img src="smiley.gif" alt="Smiley face" height="42" width="42">

iii) An HTML table is defined with the <table> tag.

Each table row is defined with the <tr> tag. A table header is defined with the <th> tag. By default, table headings are bold and centered. A table data/cell is defined with the <td> tag.

<table style="width:100%">  
  <tr>  
    <th>Firstname</th>  
    <th>Lastname</th>   
    <th>Age</th>  
  </tr>  
  <tr>  
    <td>Jill</td>  
    <td>Smith</td>   
    <td>50</td>  
  </tr>  
  <tr>  
    <td>Eve</td>  
    <td>Jackson</td>   
    <td>94</td>  
  </tr>  
</table>

iv) The<p> tag defines a paragraph.

Browsers automatically add some space (margin) before and after each <p> element. The margins can be modified with CSS (with the margin properties).

<p>This is some text in a paragraph.</p>

<html>

<head>

<script language="javascript">

functionopenwin()

{

msg=window.open("","Displaywindow","height=200,width=200,status=yes,toolbar=yes,directories=no,menubar=yes,location=yes");

msg.document.write("<html><title>A new Window</title>");

msg.document.write("<imgsrc='nathan.gif'><p><form><input type=button value=close onclick=self.close()></form></html>");

}

</script>

</head>

<body bgcolor="blue">

<form>

<input type=button value=click name=b1 onclick=openwin()>

</form>

</body>

</html>

**23. a) Explain importance of Frame tag in HTML.**

**b) Create an html page named as changebackground\_color.html**

**Define a method named as random\_color() which is to be called when you click on the body. This method should generate random number, which is used to set the background colour. (5+10)**

a)

HTML frames are used to divide your browser window into multiple sections where each section can load a separate HTML document. A collection of frames in the browser window is known as a frameset. The window is divided into frames in a similar way the tables are organized: into rows and columns.

To use frames on a page we use <frameset> tag instead of <body> tag. The <frameset> tag defines, how to divide the window into frames. The rows attribute of <frameset> tag defines horizontal frames and cols attribute defines vertical frames. Each frame is indicated by <frame> tag and it defines which HTML document shall open into the frame.

**Example:**

<!DOCTYPE html>

<html>

<head>

<title>HTML Frames</title>

</head>

<frameset rows = "10%,80%,10%">

<frame name = "top" src = "/html/top\_frame.htm" />

<frame name = "main" src = "/html/main\_frame.htm" />

<frame name = "bottom" src = "/html/bottom\_frame.htm" />

<noframes>

<body>Your browser does not support frames.</body>

</noframes>

</frameset>

</html>

b)

<!DOCTYPE html>

<html>

<body onclick="random\_bg\_color()">

<h2>JavaScript Random Color</h2>

<p>Please input a number between 1 and 10:</p>

Username:

<input type="text" id="name">

<br>

Id:

<input type="text" id="id">

<br>

<button type="button" onclick="myFunction()">Submit</button>

<p id="demo"></p>

<script>

functionrandom\_bg\_color() {

var x = Math.floor(Math.random() \* 256);

var y = Math.floor(Math.random() \* 256);

var z = Math.floor(Math.random() \* 256);

varbgColor = "rgb(" + x + "," + y + "," + z + ")";

console.log(bgColor);

document.body.style.background = bgColor;

}

</script>

</body>

</html>

**24. (a) What is an applet? What are the demerits of an applet?**

An applet (little application) is a small software program that supports a larger application program. In the past, the term applet was often associated with the Java programming language.

A Java applet may have any of the following disadvantages:

* + It requires the Java plug-in.
  + Some browsers, notably mobile browsers running Apple iOS or Android do not run Java applets at all.
  + Some organizations only allow software installed by the administrators. As a result, some users can only view applets that are important enough to justify contacting the administrator to request installation of the Java plug-in.
  + As with any client-side scripting, security restrictions may make it difficult or even impossible for an untrusted applet to achieve the desired goals. However, simply editing the java.policy file in the JAVA JRE installation, one can grant access to the local filesystem or system clipboard for example, or to other network sources other than the network source that served the applet to the browser.
  + Some applets require a specific JRE. This is discouraged.
  + If an applet requires a newer JRE than available on the system, or a specific JRE, the user running it the first time will need to wait for the large JRE download to complete.
  + Java automatic installation or update may fail if a proxy server is used to access the web. This makes applets with specific requirements impossible to run unless Java is manually updated. The Java automatic updater that is part of a Java installation also may be complex to configure if it must work through a proxy.

**(**b) **Why do applet classes need to be declared as public?**

The SimpleApplet class is declared public so the program that runs the applet (a browser or appletviewer ), which is not local to the program can access it.

**(c) Describe the different stages in the life cycle of an applet. Distinguish between init() and start() methods. ((5+2)+2+ 3+3)**

Four methods in the Applet class gives you the framework on which you build any serious applet −

init − This method is intended for whatever initialization is needed for your applet. It is called after the param tags inside the applet tag have been processed.

start − This method is automatically called after the browser calls the init method. It is also called whenever the user returns to the page containing the applet after having gone off to other pages.

stop − This method is automatically called when the user moves off the page on which the applet sits. It can, therefore, be called repeatedly in the same applet.

destroy − This method is only called when the browser shuts down normally. Because applets are meant to live on an HTML page, you should not normally leave resources behind after a user leaves the page that contains the applet.

paint − Invoked immediately after the start() method, and also any time the applet needs to repaint itself in the browser. The paint() method is actually inherited from the java.awt.

**25**. **(a) What is an applet? Explain functionalities of stop (), paint() and repaint() method. (b) Discuss the steps involved in developing and running an applet?**

**(c) Write an Applet program to show status message in Status Window.((2+3) +5+5)**

<https://www.javatpoint.com/java-applet>

**26. (a) What are the ways to run an applet?**

**(b) Write a program to show all the steps of applet life cycle.**

**(c) Write an applet to add two numbers and display the result using drawstring (). (4+6+5)**

[**https://www.javatpoint.com/java-applet**](https://www.javatpoint.com/java-applet)

**27**.**(a) Explain Local applet and Remote applet.**

**(b) Discuss the steps involved in developing and running an applet?**

**(c) Write the similarities and dissimilarities between applet program and application program. (4+7+4)**

[**https://www.javatpoint.com/java-applet**](https://www.javatpoint.com/java-applet)

**28. (a) Using the FROM tag of HTML create a registration form containing the below mentioned fields :**

**(i) First Name (Using text boxes)**

**(ii) Last Name (Using text boxes)**

**(iii) E-mail ID (Using text boxes)**

**(iv) Gender (Using radio button)**

**(v) Hobbies (Using check boxes)**

**(vi) Submit Button and Reset Button.**

**(b) What is the difference between Static and Dynamic WebPages ? What do you mean by Active Web Pages.**

**(c) In your browser there will be a textbox to enter your name. There will be a SUBMIT button. If your name field is empty then on submit this will give an alert that your name field is empty. If your name is more than10 characters long then it will give an alert to enter your name properly. Else it will display your name in capital, bold and in red colour. (4+5+6)**

1. (sample code for FORM)

<!DOCTYPE html>

<html>

<body>

<h2>HTML Forms</h2>

<form action="/action\_page.php">

First name:<br>

<input type="text" name="firstname" value="Mickey">

<br>

Last name:<br>

<input type="text" name="lastname" value="Mouse"><br><br>

<input type="radio" name="gender" value="male" checked> Male<br>

<input type="radio" name="gender" value="female"> Female<br>

<input type="radio" name="gender" value="other"> Other

<br><br>

<input type="submit" value="Submit">

</form>

<p>If you click the "Submit" button, the form-data will be sent to a page called "/action\_page.php".</p>

</body>

</html>

1. Web pages can be either static or dynamic. "Static" means unchanged or constant, while "dynamic" means changing or lively. Therefore, static Web pages contain the same prebuilt content each time the page is loaded, while the content of dynamic Web pages can be generated on-the-fly.

Standard HTML pages are static Web pages. They contain HTML code, which defines the structure and content of the Web page. Each time an HTML page is loaded, it looks the same. The only way the content of an HTML page will change is if the Web developer updates and publishes the file.

Other types of Web pages, such as PHP, ASP, and JSP pages are dynamic Web pages. These pages contain "server-side" code, which allows the server to generate unique content each time the page is loaded. For example, the server may display the current time and date on the Web page. It may also output a unique response based on a Web form the user filled out. Many dynamic pages use server-side code to access database information, which enables the page's content to be generated from information stored in the database. Websites that generate Web pages from database information are often called database-driven websites.

An active web page is a page where the browser performs the logic instead of the server. So for example when there is a page showing share prices, then it needs to be updated very frequently, e.g. every 5 seconds. A solution would be to use AJAX with JavaScript. In contrast to PHP, browser is able to execute JavaScript, so it is happening without reloading the page. So with an active page, everything is happening inside browser without the need to reload the page every time information is required.

1. (sample code)

<!DOCTYPE html>

<html lang="en"><head>

<meta charset="utf-8">

<h1>Registration Form</h1>

Use tab keys to move from one input field to the next.

<form name='registration' onSubmit="return formValidation();">

<ul>

<li><label for="userid">User id:</label></li>

<li><input type="text" name="userid" size="30" /></li>

<li><input type="submit" name="submit" value="Submit" /></li>

</ul>

</form>

</body>

</html>

29. **(a) What are the different ways of adding styles ( CSS ) to web page ? Write the precedence rule for the same. What are subgroup selectors in CSS? Give example.**

**(b) Write HTML/JavaScript code for dividing the browser window into two horizontal parts (left part is content and right part is main). Left part should contain the anchors clicking on which corresponding page to be displayed at the right part. Clearly state the assumptions regarding the developed code. ( 4 + 2 + 3 ) + 6**

(a) CSS stands for Cascading Style Sheets.

CSS describes how HTML elements are to be displayed on screen, paper, or in other media.

CSS saves a lot of work. It can control the layout of multiple web pages all at once.

CSS can be added to HTML elements in 3 ways:

• Inline - by using the style attribute in HTML elements

• Internal - by using a <style> element in the <head> section

• External - by using an external CSS file

**Inline CSS**

An inline CSS is used to apply a unique style to a single HTML element.

An inline CSS uses the style attribute of an HTML element.

This example sets the text color of the <h1> element to blue:

Example:

<h1 style="color:blue;">This is a Blue Heading</h1>

**Internal CSS**

An internal CSS is used to define a style for a single HTML page.

An internal CSS is defined in the <head> section of an HTML page, within a <style> element:

**External CSS**

An external style sheet is used to define the style for many HTML pages.

With an external style sheet, one can change the look of an entire web site, by changing one file!

To use an external style sheet, add a link to it in the <head> section of the HTML page.

**Priority** of the CSS property in a HTML document is applied top to bottom and left to right.

Values defined as Important will have the highest priority.

Inline CSS has a higher priority than embedded and external CSS.

So the final order is:

Value defined as Important > Inline >id nesting > id > class nesting > class > tag nesting > tag.

**Subgroup selector** for a style sheet rule is most often an HTML element name.

Consider the following possibilities:

* Paragraphs scattered throughout the document to be set apart from running text with wider left and right margins.
* All but one of the h2 elements in the document to be set to the color red; the one exception must be blue.
* In a three-level ordered list (ol) group, you want to assign different font sizes to each level.

Each of these possibilities calls for a different way of creating a new selector group or specifying an exception to the regular selectors.

CSS style sheets provide three simple ways of creating subgroups that can handle almost every design possibility:

* Class selectors
* ID selectors
* Descendant selectors

Using these subgroup selectors requires special ways of defining selectors in style sheet rules. These selectors also require the addition of attributes to the HTML tags they apply to in the document. Because all CSS-enabled browsers support these CSS1 subgroup selectors, you should have these deeply ingrained in your authoring repertoire.

(b) (sample code)

<!DOCTYPE html>

<html>

<head>

<meta name="viewport" content="width=device-width, initial-scale=1">

<style>

body {

font-family: Arial;

color: white;

}

.split {

height: 100%;

width: 50%;

position: fixed;

z-index: 1;

top: 0;

overflow-x: hidden;

padding-top: 20px;

}

.left {

left: 0;

background-color: #111;

}

.right {

right: 0;

background-color: red;

}

.centered {

position: absolute;

top: 50%;

left: 50%;

transform: translate(-50%, -50%);

text-align: center;

}

.centered img {

width: 150px;

border-radius: 50%;

}

</style>

</head>

<body>

<div class="split left">

<div class="centered">

<img src="img\_avatar2.png" alt="Avatar woman">

<h2>Jane Flex</h2>

<p>Some text.</p>

</div>

</div>

<div class="split right">

<div class="centered">

<img src="img\_avatar.png" alt="Avatar man">

<h2>John Doe</h2>

<p>Some text here too.</p>

</div>

</div>

</body>

</html>

(sample example of anchor)

<a href="http://www.yahoo.com#YahoosAnchor">blabla</a>

**30**.  **(a) Write a DTD and XML for the following customer data :**

**A) Customer id (must be unique)**

**B) Customer name (first and last name as to be specified)**

**C) Mobile no. (can be more than one )**

**D) Address**

**i. State**

**ii. Pin**

**iii. Country**

**E) Credit card ( may or may not be there )**

**i. Credit card no.**

**ii. Credit card type ( Domestic or International )**

**(b) Illustrate with example the use of IMAGE swapping using HTML/JavaScript. Write the HTML code for creating Table with 2 rows and 3 column and first row for the table should be with 3 column merged.**

**8 + ( 4 + 3 )**

* 1. **(sample code)**

<?xml version = "1.0" standalone="yes"?>

<!DOCTYPE document [

<!ELEMENT document (employee)\*>

<!ELEMENT employee (name, hiredate, projects)>

<!ELEMENT name (lastname, firstname)>

<!ELEMENT lastname (#PCDATA)>

<!ELEMENT firstname (#PCDATA)>

<!ELEMENT hiredate (#PCDATA)>

<!ELEMENT projects (project)\*>

<!ELEMENT project (product,id,price)>

<!ELEMENT product (#PCDATA)>

<!ELEMENT id (#PCDATA)>

<!ELEMENT price (#PCDATA)>

] >

<document>

<employee>

<name>

<lastname>Kelly</lastname>

<firstname>Grace</firstname>

</name>

<hiredate>October 15, 2005</hiredate>

<projects>

<project>

<product>Printer</product>

<id>111</id>

<price>$111.00</price>

</project>

<project>

<product>Laptop</product>

<id>222</id>

<price>$989.00</price>

</project>

</projects>

</employee>

<employee>

<name>

<lastname>Grant</lastname>

<firstname>Cary</firstname>

</name>

<hiredate>October 20, 2005</hiredate>

<projects>

<project>

<product>Desktop</product>

<id>333</id>

<price>$2995.00</price>

</project>

<project>

<product>Scanner</product>

<id>444</id>

<price>$200.00</price>

</project>

</projects>

</employee>

<employee>

<name>

<lastname>Gable</lastname>

<firstname>Clark</firstname>

</name>

<hiredate>October 25, 2005</hiredate>

<projects>

<project>

<product>Keyboard</product>

<id>555</id>

<price>$129.00</price>

</project>

<project>

<product>Mouse</product>

<id>666</id>

<price>$25.00</price>

</project>

</projects>

</employee>

</document>

<table border="0" cellspacing="0" cellpadding="0">

<tr>

<td colspan="4"><img class='imagem\_artigo' src="swap\_1\_large.png" width="200" height="225" alt="Image Swap Sample" name="swap"></td>

</tr>

<tr>

<td colspan="4"><div style="font-size: 11px; text-align: center; padding: 0px 0px 12px 0px;">« CLICK TO ENLARGE »</div>

</td>

</tr>

<tr>

<td><img class='imagem\_artigo' src="swap\_1\_large.png" width="50" height="56" alt="Thumbnail" onclick="document.swap.src='swap\_1\_large.png';">

</td>

<td><img class='imagem\_artigo' src="swap\_2\_large.png" width="50" height="56" alt="Thumbnail" onclick="document.swap.src='swap\_2\_large.png';"></td>

<td><img class='imagem\_artigo' src="swap\_3\_large.png" width="50" height="56" alt="Thumbnail" onclick="document.swap.src='swap\_3\_large.png';"></td>

<td><img class='imagem\_artigo' src="swap\_4\_large.png" width="50" height="56" alt="Thumbnail" onclick="document.swap.src='swap\_4\_large.png';"></td>

</tr>

</table>

(**b)(sample code for table)**

<!DOCTYPE html>

<html>

<head>

<style>

table, th, td {

border: 1px solid black;

}

</style>

</head>

<body>

<h2>Bordered Table</h2>

<p>Use the CSS border property to add a border to the table.</p>

<table style="width:100%">

<tr>

<th>Firstname</th>

<th>Lastname</th>

<th>Age</th>

</tr>

<tr>

<td>Jill</td>

<td>Smith</td>

<td>50</td>

</tr>

<tr>

<td>Eve</td>

<td>Jackson</td>

<td>94</td>

</tr>

<tr>

<td>John</td>

<td>Doe</td>

<td>80</td>

</tr>

</table>

</body>

</html>