

1) What is the Hexadecimal equivalent of (98899910)₁₀

How to convert from decimal to hex

Conversion steps:

1. Divide the number by 16.
2. Get the integer quotient for the next iteration.
3. Get the remainder for the hex digit by multiplying the decimals after the dot by 16
4. Repeat the steps until the quotient is equal to 0.

	Divide by 16	Quotient	Remainder	Hexa	Answer
16	98899910	6181244.375	6	6	5E517C6
	6181244.375	386327.773	12	C	
	386327.773	24145.486	8	7	
	24145.486	1509.093	1	1	
	1509.093	94.318	5	5	
	94.318	5.895	14	E	
Stop < 16	5.895	0.368	5	5	

2) Convert the following numbers to base indicated and vice-versa (Cross-Verify)

a) (1101)₂ => ()₈

Two methods: Convert binary to decimal then to octal

1	0	1	1	Answer
$1 \times 2^0 +$	$0 \times 2^1 +$	$1 \times 2^2 +$	1×2^3	
1	0	4	8	13(10)

Or more direct method group binary into groups of three starting from right

Octal (0 to 7)

3-bit binary

0	0	1	1	0	1
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decimal

octal

1

5

answer 15 (8)

Or divide the decimal 13 by base 8 = 1 quotient & remainder 5

Cross - verify

Convert 15(8) to binary

first convert octal to decimal

	1	5	
	1×8^1	5×8^0	
sum	8	5	13

convert decimal to binary

	Divide by 2	Quotient	Remainder
13 divide by 2	13	6	1
6 divide by 2	6	3	0
3 divide by 2	3	1	1
1 divide by 2	1	0	1

answer 1101

b) (1111 1111 1110)₂ => ()₁₀

Convert binary to decimal using powers

$$(111111111110)_2 = (1 \times 2^{11}) + (1 \times 2^{10}) + (1 \times 2^9) + (1 \times 2^8) + (1 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) = (4094)_{10}$$

Method not using powers

Double your previous total and add the current digit

	1	1	1	1
0 + 0 + 1	1 + 1 + 1	3 x 2 + 1	7 x 2 + 1	
1	3	7	15	
	1	1	1	1
15 x 2 + 1	31 x 2 + 1	63 x 2 + 1	127 x 2 + 1	
31	63	127	255	
	1	1	1	0
255 x 2 + 1	511 x 2 + 1	1023 x 2 + 1	2047 x 2 + 0	
511	1023	2047	4094(10)	Answer

Cross - verify decimal to binary

Divide by 2	Quotient	Remainder
4094	2047	0
2047	1023	1
1023	511	1
511	255	1
255	127	1
127	63	1
63	31	1
31	15	1
15	7	1
7	3	1
3	1	1
1	0	1

c) (221201)₃ => ()₁₀

Convert base of 3 to decimal

1	0	2	1	2	2	Answer
1 x 3 ⁰	0 x 3 ¹	3 x 3 ²	1 x 3 ³	2 x 3 ⁴	2 x 3 ⁵	
1	0	18	27	162	486	694(10)

Cross - verify decimal to base of 3

	Divide by 3	Quotient	Remainder
divide by 3	694	231	1
	231	77	0
	77	25	2
	25	8	1
	8	2	2

2 0 2

d) (76)₈ => ()₁₀

Convert octal to decimal

	7	6	Answer
	7×8^1	6×8^0	
sum	56	6	62(10)

Cross - verify decimal to octal

Divide by 8	Quotient	Remainder
62	7	6
7	8	7

e) (231)₈ => ()₂

Convert octal to binary

2	3
0 1 0	0 1 1

1
0 0 1

Answer (231)₈ = (10011001)₂

Cross - verify binary to octal

Group into 3 starting from right

	0	1	0	0	1	1
powers of 2	4	2	1	4	2	1
multiply	0	2	0	0	2	1
add		2			3	

	0	0	1
powers of 2	4	2	1
multiply	0	0	1
add		1	

f) (0xF00)₁₆ => ()₁₂

Convert hexadecimal to base of 12

0-9, A-F

First convert to decimal

F00(16)

15×16^2	0×16^1	0×16^0	3840
3840	0	0	

Convert decimal to duodecimal

Divide by 12	Quotient	Remainder	Answer 2280
	3840	0	
	320	8	
	26	2	
	0	2	

Cross - verify duodecimal to decimal

	2	2	8	0		
multiply by 12	2×12^3	2×12^2	8×12^1	0×12^0		
	3456	288	96	0		3840

Convert decimal to hexadecimal**Divide by 16**

	Remainder
3840	
240	0
15	0

Answer 15(F)00

g) (0xDACE) 16 => () 12

Convert hexadecimal to base of 12**First convert to decimal**

DACE(16)

13×16^3	10×16^2	12×16^1	14×16^0	Sum
53248	2560	192	14	56014

Convert decimal to duodecimal

Divide by 12	Quotient	Remainder	Answer 284BA(12)
56014	4667	10	
4667	388	11	
388	32	4	
32	2	8	

Cross - verify duodecimal to decimal

2	8	4	11	10		
2×12^4	8×12^3	4×12^2	11×12^1	10×12^0	Sum	
41472	13824	576	132	10	56014	

Convert decimal to hexadecimal

	Quotient	Remainder		
Divide by 16	56014	3500	14	
	3500	218	12	
	218	13	10	
	13			
	13	10	12	14
	D	A	C	E

h) (0x2B) 16 => () 8

Convert hexadecimal to base of 12**First convert to decimal**

2B(16)

2×16^1	11×16^0	Sum
32	11	43

Convert decimal to duodecimal

Divide by 12	Quotient	Remainder	Answer 37(12)
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43 3 7

Cross - verify duodecimal to decimal

multiply by 12

3	7	sum
3×12^1	7×12^0	
36	7	43

Convert decimal to hexadecimal

Divide by 16

	Quotient	Remainder	Answer in hex
43	2	11	2B

3) Convert the following numbers to the base 10 :

a) (3312)₈

	3	3	1	2	
	3×8^3	3×8^2	1×8^1	2×8^0	Answer
sum	1536	192	8	2	1738(10)

b) (167)₈

	1	6	7	
	1×8^2	6×8^1	7×8^0	Answer
	64	48	7	119(10)

c) (202103)₉

	2	0	2	1	0	3
	2×9^5		2×9^3	1×9^2	0	3×9^0
	118098		1458	81		3
	Answer	119640(9)				

d) (3132334)₁₆

	1	3	2	3	3	4
	1×16^5	3×16^4	2×16^3	3×16^2	3×16^1	4×16^0
	1048576	196608	8192	768	48	4

3

3×16^6

50331648

Answer 51585844

e) (0xF2)₁₆

15	2	Answer
15×16^1	2×16^0	242(10)

4) Convert the following base 10 numbers to the base Indicated:

a) (5610)₁₀ => ()₂

Division by 2	Quotient	Remainder
5610	2805	0
2805	1402	1
1402	701	0
701	350	1
350	175	0
175	87	1
87	43	1
43	21	1

21	10	1	
10	5	0	
5	2	1	
2	1	0	Answer
1	0	1	1010111101010(2)

b) (5610)₁₀ => ()₃

Division by 3	Quotient	Remainder	
5610	1870	0	
1870	623	1	
623	207	2	
207	69	0	
69	23	0	
23	7	2	
7	2	1	Answer
2	0	2	21200210(3)

c) (5610)₁₀ => ()₈

Division by 8	Quotient	Remainder	
5610	701	2	
701	87	5	
87	10	7	
10	1	2	Answer
1	0	1	12752(8)

d) (5610)₁₀ => ()₁₂

Division by 12	Quotient	Remainder	
5610	467	6	
467	38	11	
38	3	2	Answer
3	0	3	32B6(12)

e) (5610)₁₀ => ()₁₆

Division by 16	Quotient	Remainder		
5610	350	10	A	
350	21	14	E	
21	1	5	5	Answer
1	0	1	1	15EA(16)

g) (22110)₁₀ => ()₂

Division by 2	Quotient	Remainder	
22110	11055	0	
11055	5527	1	
5527	2763	1	
2763	1381	1	
1381	690	1	
690	345	0	
345	172	1	
172	86	0	
86	43	0	
43	21	1	
21	10	1	
10	5	0	

5	2	1	
2	1	0	Answer
1	0	1	101011001011110(2)

f) $(22110)_{10} \Rightarrow ()_3$

Division by 3	Quotient	Remainder	
22110	7370	0	
7370	2456	2	
2456	818	2	
818	272	2	
272	90	2	
90	30	0	
30	10	0	
10	3	1	
3	1	0	Answer
1	0	1	1010022220(3)

h) $(22110)_{10} \Rightarrow ()_8$

Division by 8	Quotient	Remainder	
22110	2763	6	
2763	345	3	
345	43	1	
43	5	3	Answer
5	0	5	53136(8)

i) $(22110)_{10} \Rightarrow ()_{12}$

Division by 12	Quotient	Remainder	
22110	1842	6	
1842	153	6	
153	12	9	
12	1	0	Answer
1	0	1	10966(12)

j) $(22110)_{10} \Rightarrow ()_{16}$

Division by 16	Quotient	Remainder	
22110	1381	14	
1381	86	5	
86	5	6	Answer
5	0	5	565E(16)

5) Convert the following floating numbers to binary, base 3, octal, and hexadecimal. Any fractions that do not terminate should be truncated to 4 digits in the fractional part.

1) $(34.34)_{10}$ to binary

Convert exponent to binary

Division by 2	Quotient	Remainder
34	17	0
17	8	1
8	4	0
4	2	0
2	1	0
1	0	1

Binary exponent 100010

Convert mantissa to binary by multiplying by 2

0.34 x 2	0.68	0
0.68 x 2	1.36	1
0.36 x 2	0.72	0
0.72 x 2	1.44	1

Binary mantissa 1010

Answer 1000010.0101

1) (34.34) 10 to base 3

Convert exponent to base 3

Division by 3	Quotient	Remainder
34	11	1
11	3	2
3	1	0
1	0	1

Base 3 exponent 1021

Convert mantissa to base 3 by multiplying by 3

0.34 x 3	1.02	1
0.2 x 3	0.6	0
0.6 x 3	1.8	1
0.8 x 3	2.4	2

Base 3 mantissa 1012

Answer base (3) 1021.1012

1) (34.34) 10 to octal

Convert exponent to octal

Division by 8	Quotient	Remainder
34	4	2
4	0	4

Octal exponent 42

Convert mantissa to octal by multiplying by 8

0.34 x 8	2.72	2
0.72 x 8	5.76	5
0.76 x 8	6.08	6
0.08 x 8	0.24	0

Octal mantissa 2560

Answer octal 42.256

1) (34.34) 10 to hexadecimal

Convert exponent to hexadecimal

Division by 16	Quotient	Remainder
34	2	2

2 0 2

Hex exponent 22

Convert mantissa to hexadecimal by multiplying by 16

0.34 x 16	5.44	5
0.44 x 16	7.04	7
0.04 x 16	0.64	0
0.64 x 16	10.24	10

Hex mantissa 570A

Answer hex 22.570A

2) (125.125)₁₀

Convert exponent to binary

Division by 2	Quotient	Remainder
125	62	1
62	31	0
31	15	1
15	7	1
7	3	1
3	1	1
1	0	1

Binary exponent 1111101

Convert mantissa to binary by multiplying by 2 until 1.00

Carry over

0.125 x 2	0.250	0
0.250 x 2	0.500	0
0.500 x 2	1.000	1

Binary mantissa 100

Answer 1111101.001

2) (125.125)₁₀ to base 3

Convert exponent to base 3

Division by 3	Quotient	Remainder
125	41	2
41	13	2
13	4	1
4	1	1
1	0	1

Base 3 exponent 11122

Convert mantissa to base 3 by multiplying by 3

0.125 x 3	0.375	0
0.375 x 3	1.125	1
0.125 x 3	0.375	0
0.375 x 3	1.125	1

Base 3 mantissa zero101

Answer base (3) 11122.0101

2) (125.125) 10 to octal

Convert exponent to octal

Division by 8	Quotient	Remainder
125	15	5
15	1	7
1	0	1

Octal exponent 175

Convert mantissa to octal by multiplying by 8

0.125 x 8 1

Octal mantissa 1.000

Answer octal 175.1000

2) (125.125) 10 to hex

Convert exponent to hexadecimal

Division by 16	Quotient	Remainder
125	7	13
7	0	7

Hex exponent 7D

Convert mantissa to hexadecimal by multiplying by 16

0.125 x 16 2

Hex mantissa 2000

Answer hex 7D.2000

3) (10.16) 10

Convert exponent to binary

Division by 2	Quotient	Remainder
10	5	0
5	2	1
2	1	0
1	0	1

Binary exponent 1010

Convert mantissa to binary by multiplying by 2

0.16 x 2	0.32	0
0.32 x 2	0.64	0
0.64 x 2	1.28	1
0.28 x 2	0.56	0

Answer 1010.0010

3) (10.16) 10 to base 3

Convert exponent to base 3

Division by 3	Quotient	Remainder
10	3	1

3	1	0
1	0	1

Base 3 exponent 101

Convert mantissa to base 3 by multiplying by 3

0.16 x 3	0.48	0
0.48 x 3	1.44	1
0.44 x 3	1.32	1
0.96 x 3	2.88	2

Base 3 mantissa zero112

Answer base (3) 101.0112

3) (10.16)₁₀ to octal

Convert exponent to octal

Division by 8	Quotient	Remainder
10	1	2
1	0	1

Octal exponent 12

Convert mantissa to octal by multiplying by 8

0.16 x 8	1.28	1
0.28 x 3	2.24	2
0.24 x 3	0.72	0
0.72 x 3	2.16	2

Octal mantissa 1202

Answer octal 12.1202

1) (10.16)₁₀ to hexadecimal

Convert exponent to hexadecimal

Division by 16	Quotient	Remainder
10	0	10

Hex exponent A

Convert mantissa to hexadecimal by multiplying by 16

0.16 x 16	2.56	2
0.56 x 16	8.96	8
0.96 x 16	15.36	15
0.36 x 16	5.76	5

Hex mantissa 28F5

Answer hex A.28F5

6) What is the largest positive number one can represent in a 12-bit 2's complement code?

Write your result in binary and decimal?

(Unsigned)

Maximum number in 12 bits: 1111 1111 1111
 Decimal 4095(10)

(Signed)

Maximum number in 12 bits: 0111 1111 1111
 Decimal 2's comp 2047

7) What are the 8-bit patterns used to represent each of the characters in the string "CODE/THS 2019 "? (Only represent the characters between the quotation marks.)

**Note: There is space between THS and 2019 .

Character	ASCII Value	Binary
C	67	0100 0011
O	79	0100 1111
D	68	0100 0100
E	69	0100 0101
/	47	0010 1111
T	84	0101 0100
H	72	0100 1000
S	83	0101 0011
Space	32	0010 0000
2		0000 0010
0		0000 0000
1		0000 0001
9		0000 1001

8) What is the biggest binary number you can write with 5 bits?

Description	Binary	Decimal	General form
Biggest 5 bit	(11111) ₂	31	$[2^5-1]$

9) In hex, 2BFC + 54A7 ??

A = 10, B = 11, C = 12, D = 13, E = 14, F = 15

First calculate decimal equivalent

Hex	Decimal
2BFC	$2 \times 16^3 + 11 \times 16^2 + 15 \times 16^1 + 12 \times 16^0$ 11260
54A7	$5 \times 16^3 + 4 \times 16^2 + 10 \times 16^1 + 7 \times 16^0$ 21671

Add
 11260
 21671
 Decimal 32931
 Answer Hex 80A3

12) Convert the following binary fractions to ordinary fractions

• 0.1001

Mantissa 0.1001

.	2^{-1}	2^{-2}	2^{-3}	2^{-4}	
	1/2	1/4	1/8	1/16	
	0.5	0.25	0.125	0.0625	Answer
	1	0	0	1	1/32
multiply	0.5	0	0	0.0625	0.03125

• 1.0011

Mantissa	0.0011				
	2^{-1}	2^{-2}	2^{-3}	2^{-4}	Answer
	1/2	1/4	1/8	1/16	1.75 = 1 3/4
	0.5	0.25	0.125	0.0625	
multiply	1	1	0	0	
add	0.5	0.25	0	0	0.75

• 1.1111

Mantissa	0.1111				
	2^{-1}	2^{-2}	2^{-3}	2^{-4}	Answer
	1/2	1/4	1/8	1/16	1.9375 = 1 15/16
	0.5	0.25	0.125	0.0625	
multiply	1	1	1	1	
add	0.5	0.25	0.125	0.0625	0.9375

13) The decimal expansion of 11/17 is 0.647. Find the binary expansion of the fraction 11/17.

0.647 x 2	1	0.294
0.294 x 2	0	0.588
0.588 x 2	1	0.176
0.176 x 2	0	0.352
0.352 x 2	0	0.704

Answer 0.10100

14) The decimal expansion of 3/11 is 0.2727. Find the binary expansion of the fraction 3/11.

0.2727 x 2	0	0.5454
0.5454 x 2	1	0.0908
0.0908 x 2	0	0.1816
0.1816 x 2	0	0.3632
0.3632 x 2	0	0.7264

Answer 0.01000

15) 16) same question as 13) 14)

17) What is the significance of the 127.0.0.1 address ?

127.0.0.1 is the loopback Internet protocol (IP) address also referred to as the localhost.

The address is used to establish an IP connection to the same machine or computer being used by the end-user.

18) How many bits are in IPv4 IPv6?

The two most common versions of IP in use today are Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6). Both IPv4 and IPv6 addresses come from finite pools of numbers.

For IPv4, this pool is 32-bits

The IPv6 address space is 128-bits

19) Convert this IP Address in Binary Dot Notation 11000000.10010000.00001010.00001010

into its equivalent decimal Dot Notation?

192.144.10.10

20) What is the range of IPv4 addresses ?

IPv4 addresses are usually represented in dot-decimal notation, consisting of four decimal numbers, each ranging from 0 to 255, separated by dots, e.g., 172.16.254.1.

Each part represents a group of 8 bits (an octet) of the address.

21) Explain the Classification of IP Addresses ?

TCP/IP defines five classes of IP addresses: class A, B, C, D, and E.

Each class has a range of valid IP addresses.

The value of the first octet determines the class.

IP addresses from the first three classes (A, B and C) can be used for host addresses.

The other two classes are used for other purposes – class D for multicast and class E for experimental purposes.

Class	Start address	End address
Class A	0.0.0.0	127.255.255.255
Class B	128.0.0.0	191.255.255.255
Class C	192.0.0.0	223.255.255.255
Class D (multicast)	224.0.0.0	239.255.255.255
Class E (reserved)	240.0.0.0	255.255.255.255

22) Why are we running out of IPv4 Addresses?

Because the original Internet architecture had fewer than 4.3 billion addresses available, depletion has been anticipated since the late 1980s, when the Internet started experiencing dramatic growth.

This depletion is one of the reasons for the development and deployment of its successor protocol, IPv6. IPv4 and IPv6 coexist on the Internet.

Reasons why we are running out of Ipv4 addresses are

1. The original design was for a government/academic experiment not for a global public
2. There are 4.3 billion addresses and the current world population is over 7 billion
3. Each person may have a laptop, printer, mobile phone, tablet, gaming console, smart TV, IoT etc each requiring an IP address

23) Can a device have both IPv4 and IPv6 address simultaneously?

IPv4-IPv6 coexistence can be achieved by mainly three techniques.

One is dual stack, where your network hardware runs IPv4 and IPv6 simultaneously.

The second one is tunnel, meaning encapsulating IPv6 packets within IPv4 packets.

The last method is called Network Address Translation (NAT) by which a device translates IPv6 by ISPs packets into IPv4 packets or vice versa.

24) IPv4 classification is done on which octet of IPv4 address format ?

The first octet of a Class A IPv4 address is used to identify the Network and the three remaining octets are used to identify the host in that particular network (Network.Host.Host.Host).

25) Class E IP Addresses are currently used for which purpose?

Class E is for experimental purposes.

There is no defined use for this address class.

Officially, it is listed as reserved for usage and testing by IANA and the Internet Research Task Force (IRTF).

26) Which class does this ip address 224.255.255.1 belong to?

Class D multicast

Multicast IP Routing protocols are used to distribute data (for example, audio/video streaming broadcasts) to multiple recipients. Using multicast, a source can send a single copy of data to a single multicast address, which is then distributed to an entire group of recipients.

27) What are Private IP Addresses and What is their range?

Any IP address that falls specified ranges is a private IP address and is non-routable on the Internet. These addresses are reserved for use only within private/corporate network and cannot be seen outside the private networks.

Private IP Addresses have the following ranges:

10.0.0.0 - 10.255.255.255

172.16.0.0 - 172.31.255.255

192.168.0.0 - 192.168.255.255

28) Given an IP Address can I differentiate between Public and Private IP Address?

Yes you can by looking at the private IP ranges

	PRIVATE IP	PUBLIC IP
CLASS A	10.0.0.0 – 10.255.255.255	1.0.0.0 – 9.255.255.255 11.0.0.0 – 126.255.255.255
CLASS B	172.16.0.0 – 172.31.255.255	128.0.0.0 – 172.15.255.255 172.32.0.0 – 191.255.255.255
CLASS C	192.168.0.0 – 192.168.255.255	192.0.0.0 – 192.167.255.255 192.169.0.0 – 223.255.255.255

29) Define Port? What does the Port Number represent?

A port is a communication endpoint for passing data over the network.

A port is typically associated with a specific application or protocol.

Port 80, for example, is normally used for the http protocol and, therefore, Web traffic.

30) Port numbers used by HTTP, FTP, HTTPS, SMTP are ?

Number

Assignment

20 File Transfer Protocol (FTP) Data Transfer

21 File Transfer Protocol (FTP) Command Control

25 Simple Mail Transfer Protocol (SMTP) E-mail routing

80 Hypertext Transfer Protocol (HTTP) used in the World Wide Web

443 HTTP Secure (HTTPS) HTTP over TLS/SSL

31) What is a web server and client ? Command used to start a simple python HTTP server in Linux?

In general, all of the machines on the Internet can be categorized as two types: servers and clients. Those machines that provide services (like Web servers or FTP servers) to other machines are servers. And the machines that are used to connect to those services are clients.

```
$ python -m SimpleHTTPServer
```

32) What is the difference between URI , URL, URN ?

URI (uniform resource identifier) identifies a resource (text document, image file, etc)
A URI is an identifier. The URL is the location.

URL (uniform resource locator) is a subset of the URIs that include a network location
<https://google.com>

URN (uniform resource name) is a subset of URIs that include a name within a given space,
but no location
Example of URN: urn:isbn:0-486-27557-4

33) What are Server side programming languages ? Name a few server side programming languages ?

In a full stack web development, there are three layers.
They are the front-end, back-end that is the server-side and the database.
These are all considered a part of the full stack web development tools.

Server side technology are a set of tools and programming languages that are used to design, build and maintain server side operations of a web application.

Server side programming languages

PHP
Node.js
Java
Python
Ruby

34) Can JavaScript be considered as a client side programming language ?

JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server.

35) What does the DNS server consist of and what is the importance of it ? Define Root Servers?

DNS is a large network of servers located across the globe that contain a distributed database of domain names and IP addresses. Often referred to as the Internet's address book.

It is important because it translates domain names like www.google.com to a machine-readable IP addresses which humans can't memorize

Root servers are the authoritative name servers that serve the DNS root zone, they are a network of hundreds of servers in many countries around the world. These servers can directly answer queries for records stored or cached within the root zone, and they can also refer other requests to the appropriate Top Level Domain (TLD) server. The 13 root name servers are operated by 12 independent organisations.

36) What is DNS spoofing ?

DNS spoofing, also referred to as DNS cache poisoning, is a form of computer security hacking in which corrupt Domain Name System data is introduced into the DNS resolver's cache, causing the name server to return an incorrect result record, e.g. an IP address. This results in traffic being diverted to the attacker's computer (or any other computer).

37) What are Status Codes in HTTP? What are HTTP Request Methods?

HTTP Status Codes 200, 400, 502 and 201 for ?

HTTP defines a set of request methods to indicate the desired action to be performed for a given resource.

The primary or most-commonly-used HTTP verbs (or methods, as they are properly called) are POST, GET, PUT, and DELETE.

These correspond to create, read, update, and delete (or CRUD) operations, respectively.

HTTP response status codes indicate whether a specific HTTP request has been successfully completed.

200 The request has succeeded.

201 Created The request has succeeded and a new resource has been created as a result. This is typically the response sent after POST requests, or some PUT requests.

400 Bad Request The server could not understand the request due to invalid syntax.

502 Bad Gateway The server, while working as a gateway to get a response needed to handle the request, got an invalid response.

38) What is the role of Model , View and Controller in MVC architecture?

Role of Client and Server in Client Server Architecture?

MVC is a software design pattern commonly used for developing user interfaces that divides the related program logic into three main components.

In the MERN stack the Model would be Mongoose which holds the data-related logic

The View component would be React Js which handles all the UI logic of the application

The Controller would be Express that acts as an interface between the Model and View

components to process the business logic and incoming requests, manipulate the data using the Model component and interact with the Views to render the final output.

39) What is a Compiler, How is JavaScript code executed ? Using Compiler or interpreter?

It converts the entire program file into object code(binary code) all at once.

Examples of compiled programming languages are C and C++.

Javascript is an interpreted language not a compiled language like C. JS has no compilation step instead does a line by line execution of instructions before conversion to machine code

40) What is a JIT (Just In Time compilers), what is their role in the modern day web Browsers?

JIT compiler executes computer code at run time during the execution itself, rather than before execution improving the performance of interpreted programs

JIT combines the best parts of both compilers and interpreters making translation and execution fast

JIT compilation happens on the browser such as Chrome's V8 engine which identifies code that can be optimized by avoiding retranslation

41) What is the purpose of VPN ? How are VPN and Firewalls Related?

(VPN) gives you online privacy and anonymity by creating a private network from a public internet connection. VPNs mask your internet protocol (IP) address so your online actions are virtually untraceable.

A firewall is a security device — computer hardware or software — that can help protect your network by filtering traffic and blocking outsiders from gaining unauthorized access to the private data on your computer

A VPN, which prevents monitoring of a user's traffic and secures data, doesn't allow the user to establish restrictions (packet restrictions or network port restrictions) on the system in the way that a firewall does.

Both have different functions and complement each other when providing web security.