

BCS-13 Internet & Java Programming

Internet : It came into public use in 1980.

Network of networks that connects computers all over the world.

1969 - US Military Services.

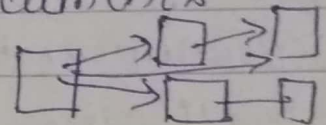
[ARPANET Project]

Advanced Research Project ^{Agency} Advisory Network.

NSFNET - National Science Foundation Network.

1989 → WWW [World Wide Web]

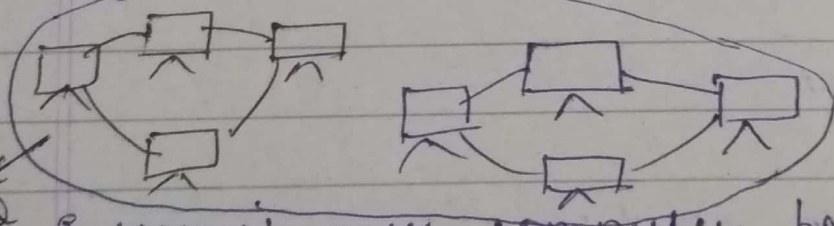
(i) collection of hypertext documents



(ii) It is a service that operates over Internet.

founder: Tim Berners-Lee

at CERN, Geneva (Switzerland)

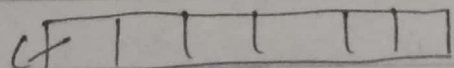


when we login into

Internet our computer becomes host.

IP
Protocol
Internet
Protocol

Packets (data chunks) Information



IP Address: www.google.com
domain name ↓
IP Address (Numeric)

xxx.xxx.xxx.xxx
DNS Server (it decode the ip address) into

172.19.312.8090.

Domain name
system
Server

Port:- Input for specific Internet service.

80 → www. second level domain /
(chosen by user.)

Domain name

www.mmmut.ac.in

domain name → Top level domain

com - commercial
org - non u
gov - government
mil - military
edu - education

two letter
(country)

Three letter
(type of organisation)

Internet Services:-

- Email
- online chat
- web
- voice & video conferencing
- web
- File Transfer

How do we connect to Internet services

- PPP of SKIP Account :-
 ↓
 Point to Point Protocol
- Dial-up Networking
 (Modem and Phone line)
- ISDN of ADSL :-
 ↓
 Integrated services Digital Network
 → Asymmetric Digital System line
 phone connection
 High speed dial up connection line.
- Leased lines: Cable & DSL :-
 (for remaining always connected to Internet) Digital satellite system [Hughes DirecPC]
- Web TV [like a computer]
 # web applications :-
- online shopping
- # choosing ISP :- Internet service provider
- (1) local number (computer) (2) Price (cheaper)
 - (3) speed (high speed) (4) support 24x7
 - (5) Accessibility (not busy access numbers)
- # E-mail concepts
- abc@gmail.com
 ↓
 username Domain name
- signifies that it is a email

- ① Receiving Email: POP3 (Post Office Protocol version 3)
 - ② Sending Email: SMTP (Simple Mail Transfer Protocol)
- email client eg. Outlook.

③ E-mail address: abc@gmail.com

④ Accessing E-mail:

- (i) E-mail client (eg. Outlook, Thunderbird)
 - (ii) Web-based E-mail
 - (iii) Unix shell Account
- E-mail client:- Pine, Eudora, Post.

⑤ Securing E-mail: E-mail Not Secure

Proper way of using email

- (i) Subject should be precise.
- (ii) Concise.
- (iii) No defamatory mails
- (iv) Not too many mails
- (v) Not for fun.
- (vi) Complete (relevant)

Netizens (Net users)

NOTE: It is mail formatting multipurpose Internet mail extension (document and text)

⑥ Securing E-mail → Email Attachments

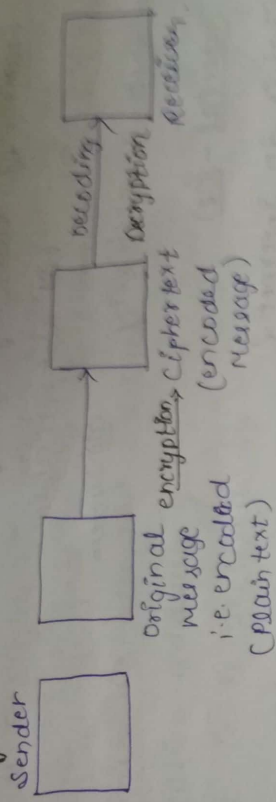
- Encryptions of Smiley
- Email Signature
- Authentication AKA, ROTFL, etc.
- Authentication AKA, ROTFL, etc.

* Public Key cryptography (Private & Public key)

* Digital certificate PGP (Pretty Good Privacy)

Emails are stored at POP3 server

Cryptography:



Public key cryptography - Two keys (Private & Public Key)

Symmetric key cryptography (single key)

Asymmetric key cryptography (Two key)

Each has private key & Receiver has public key.

Digital certificate - PAR (PKC approaches)

Issues by certificate Authority eg. Verisign

eg: Privacy. Good Privacy (web of Trust)

People sign each other certificates.

Voice & Video Conferencing:

Voice conferencing - Microphone, Speaker.

Video - Image & video
Microphone, speaker, camera

Hardware seq. - NetMeeting (Microsoft)

Software seq. - Netscape conference (Netscape Communications)

Net-see Me (white Pine software)

Advantages of video conf. -

* Collaboration

* Business event.

* Share document

* Share application

* Chat

* File Transfer

TFN

Advantages of video conferencing:

(i) Same time (ii) Not portable

(iii) Internet connectivity (iv) System

Ques Terminal - (12)

(a) What is an Internet?

What are Web Addresses. Explain the general syntax of web address.

(b) What are different Hardware of Software Required for video conferencing? Explain each in brief.

(c) Compare & contrast different technologies available for Internet access.

(d) Explain the purpose of the following -

* DNS * ISP

(e) What is an e-mail? Explain the purpose of MIME.

(f) Describe features for selecting an ISP.

(g) Describe Internet services.

(h) Discuss approaches for sending & receiving secure mail.

(i) Discuss public key cryptography.

(j) What is a digital certificate? Explain.

(k) Distinguish b/w MIME & SMIME.

(l) How are send & receive e-mail?

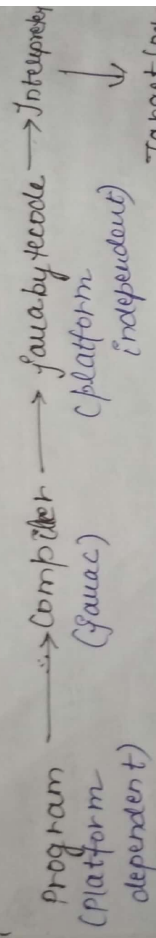
Ans: e
More
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and
Post
thro

- Unit - (Q2)
 How or specific environment in which program run.
- It is a platform independent language. (diff. o/p sys)
 - Java is an object oriented programming language.
 - It is a case-sensitive language.
 - It is a simple and safe language. (free of pointers)

platform independent becoz of two things -

JVM (Java Virtual Machine)

JRE (Java Runtime Environment)



→ It is portable i.e. can move from one system to another system same o/p system or diff.

→ It is architectureally neutral
 can work both on 32 bit & 64 bit comp. system

→ It is robustness becoz of -
 if there is a failure then system can deal with it & it will not be crashed

① Exception handling feature

② Automatic garbage collection (we will not have to think about memory utilisation it will automatically handle memory management).

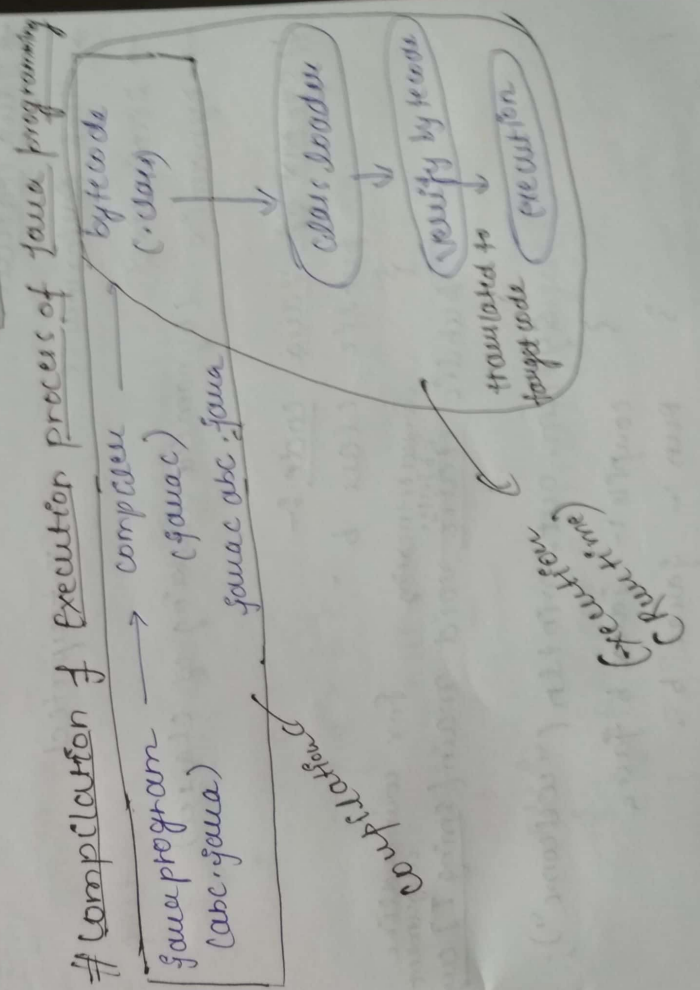
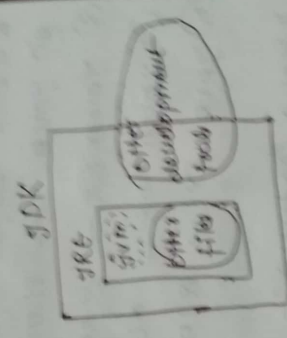
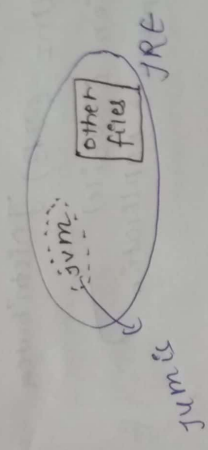
→ Java has multithreading.

(multithreads are small programs which take very less memory in comparison to programs) used for complex tasks

source code → verify code → Run code.

compiler only verify code i.e. translation of error.
 Interpreter translates and executes code. #

JVM (Java Virtual Machine)	JRE (Java Runtime Environment)	JDK (Java Development Kit)
<ul style="list-style-type: none"> * It is a virtual machine with no physical existence. * It is interpreter for bytecode. * It provides run time environment. 	<ul style="list-style-type: none"> * Java is a part of JRE. * It contains library files & other files of JVM. * It is a physical existence. 	<ul style="list-style-type: none"> * It is a type of standard 1.6.74 has physical existence. * It provides all tools to develop software.



* It was developed by James Gosling at Sun Microsystems in 1995

Java SE 12 (March 2019)

C:\jdk\bin

C:\jdk\bin\java

C:\jdk\bin\javac

Java Applications :-

Desktop Applications, windows media player, Android, Mobile Applications, Robotics, Smart Cards etc web Applications (JSP, Servlet).

Java Platforms or Editions:

- 1) Java SE - standard edition.
- 2) Java EE - Enterprise Edition (RMI, EJB) } Distributed
- 3) Java ME - Micro Edition (mobile) }
- 4) Java FX - RIA (Rich Internet Application)

Java Features :-

- High Performance
- Distributed
- Dynamic (dynamic linking of classes)

Syntax of Java code :-

```
public class b {  
    // variables  
    public static void main (String[] args) {  
        System.out.println ("welcome");  
    }  
}
```

compile :- javac b.java

run :- java b

A variable's name can be changed during execution.

P.O
WAP to subtract two numbers;

```
public class subtraction  
{  
    public static void main(String[] args)  
    {  
        int a = 10, b = 5;  
        // Difference of a & b is 5  
        System.out.println(a - b);  
        System.out.println(a - b);  
    }  
}
```

3. ... which cannot be

Keywords :- Reserved words which cannot be used as variable name.
P.O
WAP in java to display largest of two numbers.

```
public class LargestNumber
```

```
{  
    public static void main(String[] args)  
    {  
        int a = 15, b = 20;  
        if (a > b)  
        {  
            System.out.println("Largest no. is: a");  
        }  
        else  
        {  
            System.out.println("Largest no. is: b");  
        }  
    }  
}
```

Operators in Java:

- ① Unary Operator: ++, --
- ② Arithmetic Operator: +, -, *, /, %
- ③ Relational Operator: >, >=, <, <=, ==, !=
- ④ Logical Operator: &&, ||, !
- ⑤ Shift Operator: <<, >>
- ⑥ Ternary Operator: ? :
- ⑦ Assignment Operator: =, +=, -=

i. (P.3) Write a program to check even or odd.

```
public class EvenOdd {
```

```
    public static void main(String[] args)
```

```
    {  
        int n = 3;
```

```
        if (n % 2 == 0)
```

```
        {  
            System.out.println("n + "is even no.");
```

```
        }  
        else
```

```
        {  
            System.out.println("n + "is odd no.");
```

```
        }  
    }
```

Data types in Java?

Primitive

data type

or
built in data type

Numeric

Integer

Floating

Non-Primitive

data type

eg. Array, String, Class

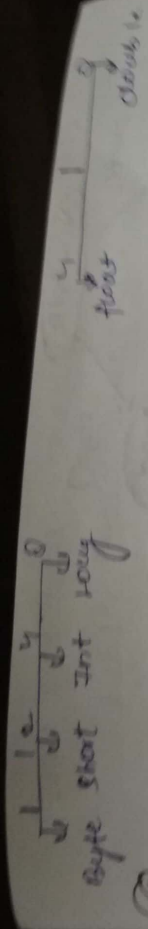
Interface

Char

(1 byte)

Boolean

(1 byte)

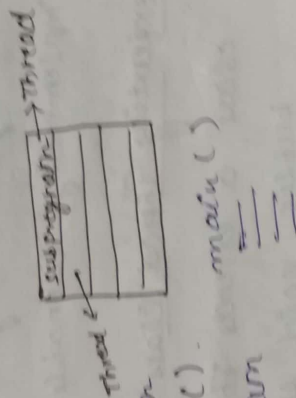


Ex) app in java to print no. 4 to 8.

```
public static void main(String[] args)
{
    public class Number {
        public static void main(String[] args)
        {
            int i;
            for (i = 4; i <= 8; i++)
            {
                System.out.println(i);
            }
        }
    }
}
```

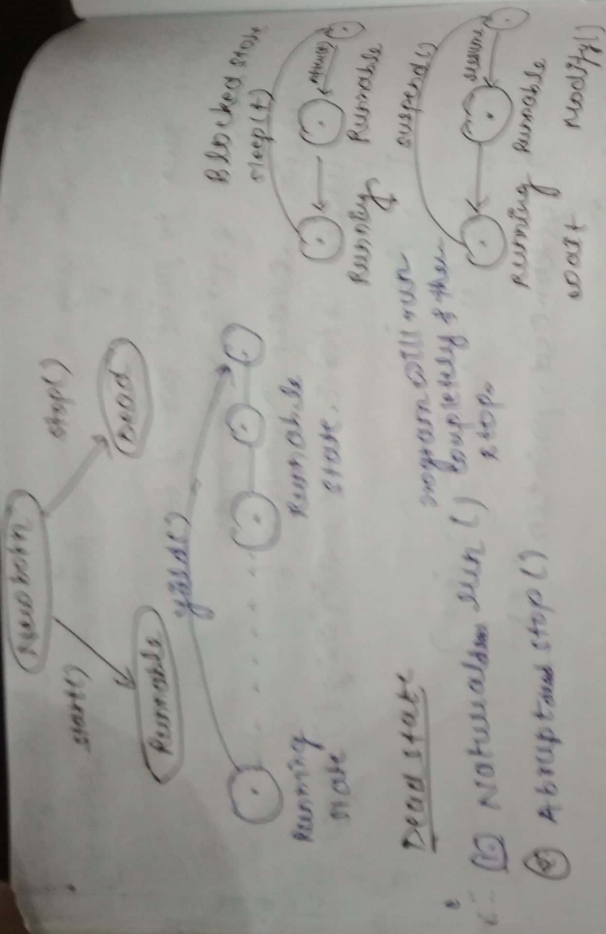
Multithreading:

→ Single threaded program having only main().
→ multithreaded program



Life cycle of a Thread: (Thread state)

- (1) Newborn
- (2) Runnable: start()
- (3) Running
- (4) Blocked: sleep(t), suspend(), wait()
- (5) Dead: stop()



Dead state

1. (a) Normal stop
2. (b) Abrupt stop

Creating Thread class

1. (a) By extending Thread class,
2. (b) By implementing Runnable Interface.

(a) By extending Thread class

```

class a extends Thread {
    public void run()
    {
        for(int i=1; i<=5; i++)
        {
            System.out.println(i);
        }
    }
}

```

o/p - 1
2
3
4
5
from a.

```

class b extends Thread {
    public void run() {
        System.out.println("Dilome");
    }
    System.out.println("exit from b");
}
    o/p - Dilome
    exit from b

```

```

class c extends Thread {
    public void run() {
        int a=5; int b=2;
        int d;
        d = a-b;
        System.out.println("d");
    }
    System.out.println("exit from c");
}
    o/p - 3
    exit from c

```

```

class ct {
    public static void main (String[] args) {
        a obj1 = new a();
        b obj2 = new b();
        c obj3 = new c();
        obj1.start();
        obj2.start();
        obj3.start();
    }
}

```



```
System.out.println("Exit from main");
```

Q By Implementing Runnable Interface:

class implements Runnable

```
{ public void run()
```

```
{ for(int i=1; i<=8; i++)
```

```
System.out.println(i);
```

```
}
```

```
System.out.println("Exit from a");
```

```
}
```

```
class ct
```

```
{ public static void main(String[] args)
```

```
{ a obj = new a();
```

```
Thread objt = new Thread(obj);
```

```
}
```

```
System.out.println("Exit from main");
```

```
}
```

How to set priority in Thread Applet.

Q.1) WAP in Java to depict blocked states of a thread

class a extends Thread

{ public static void main (arr())

{ for (int i=1; i<=5; i++)

{ System.out.println ("welcome");

if (i==3)

{ sleep(100);

}

}

class ct

{ public static void main (String[] args)

{

a obj = new a();

O/P:

obj.start();

}

}

1
2
3
:
4
5

Blocked states of a thread :-

① sleep(ms)

② suspend() → resume

③ wait()

notify()

Dead state of a Thread:

```
class a extends Thread
{
    public static void main ()
    {
        for (int i=1; i<=7; i++)
        {
            System.out.println(i);
            if (i==6)
            {
                i.stop();
            }
        }
    }
}
```

OP: 1
2
3
4
5
6

class ct

```
{
    public static void main (String[] args)
    {
        obj = new a();
        obj.start();
    }
}
```

In dead state, thread never resumes while in sleep() it resumes after given time period.

Q. Tutorial → Multithreading

1. Describe Thread & multithreading in Java.
2. Discuss different states of thread.
3. Explain the two methods for creating thread.
4. Illustrate In a state blocked & thread states in Java.
5. Distinguish b/w Block of Thread states.
6. Describe the steps of setting priority of a thread.

Tutorial - 1

- 1) Explain why Java is so popular programming language.
- 2) Explain different data types available in Java.
- 3) Discuss diff. operators in Java.
- 4) Describe features of Java Programming Language.
- 5) Distinguish between Java & C++ programming language.
- 6) Write in Java to display element of an array.
- 7) Write in Java to display factorial of a no.

Prob 1 Write in Java to display Fibonacci series.

```
class Fibonacci {  
    public static void main (String[] args)  
    {  
        int a = 0, b = 1, s = 0;  
        System.out.println(a);  
        System.out.println(b);  
        int i;  
        while (i++ < 10) {  
            s = a + b;
```

```
            System.out.println(s);
```

```
            a = b;
```

```
            b = s;
```

```
        }
```

```
    }
```

```
}
```

0, 1, 1, 2, 3, 5, 8

Prob. 1. WAP in Java to display factorial of a no.

```
class factorial {
```

```
    public static void main(String[] args)
```

```
    {
```

```
        int i = 5;
```

```
        fact = 1;
```

```
        for (i = 5;
```

```
            i > 1;
```

```
            {
```

```
                fact = fact * i;
```

```
            }
```

```
        }
```

```
        System.out.println(fact);
```

```
    }
```

```
}
```