Unit - IV **CHAPTER – 16**

INHERITANCE

PART I

Choose the correct answers

1. Which of the followingis the process of creating new classes from an existing class
   (a) Polymorphism **(b) Inheritance** (c) Encapsulation (d) super class
2. Which of the following derives a class student from the base class school
   (a) school: student **(b) class student : public school**
   (c) student : public school (d) class school : public student
3. The type of inheritance that reflects the t ransitive nature is
   (A) Single Inheritance (B) Multiple Inheritance **(C) Multilevel Inheritance** (D)Hybrid Inheritance
4. Which visibility mode should be used when you want the features of the base class to be available to the derived class but not to the classes that are derived from the derived class?
   (A) Private (B) Public (C) Protected (D) All of these
5. Inheritance is process of creating new class from
   (A) Base class (B) abstract (C) derived class (D) Function
6. A class is derived from a class which is a derived class itself, then this is referred to as
   (A) multiple inheritance **(B) multilevel inheritance**
   (C) single inheritance (D) double inheritance
7. Which amongst the following is executed in the order of inheritance?
   (A) Destructor (B) Member function **(C) Constructor** (D) Object
8. Which of the following is true with respect to inheritance?
   (A) Private members of base class are inherited to the derived class with private
   (B) Private members of base class are not inherited to the derived class with private accessibility
   (C) Public members of base class are inherited but not visible to the derived class
   (D) Protected members of base class are inherited but not visible to the outsideclass
9. Based on the following class declaration answer the questions (from9.1 o 9.5)

```
class vehicle
{ int wheels;
public:
void input_data(float,float);
void output_data();
protected:
int passenger;
};
class heavy_vehicle : protected vehicle {
int diesel_petrol;
protected:
int load;
protected:
int load;
public:
voidread_data(float,float)
voidwrite_data(); };
class bus: private heavy_vehicle {
charTicket[20];
public:
voidfetch_data(char);
voiddisplay_data(); };
};
```

9.1. Which is the base class of the class heavy_vehicle?

(a) Bus (b) heavy_vehicle **(c) vehicle** (d) both (a) and (c)

9.2. The data member that can be accessed from the function displaydata()

(a) passenger (b) load (c) Ticket **(d) All of these**

9.3. The member function that can be accessed by an objects of bus Class is

(a) input_data() (b) read_data(), output_data(), write_data()

(c) fetch_data() , display_data() (d) All of these

9.4. The member function that is inherited as public by Class Bus

(a) input_data() (b) read_data() , output_data() , write_data()

(c) fetch_data() , display_data() **(d) All of these**

10.

```
class x
{ int a;
public :
x()
{}
};
class y
{ x x1;
public :
y(){}
};
class z : public y,x
{
int b;
public:
z(){}
}z1;
```

What is the order of constructor for object z1 to be invoked?

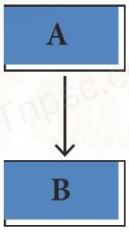
(A) z , y,x,x (B) x,y,z,x (c) y,x,x,z **(D) x,y,z**

PART II

Answer to the all questions (2 Marks):

1. What is inheritance?

The mechanism of deriving new class (Derived class) from an existing class (Base class) is called inheritance.



Base class (Parent)

Derived class (Child)

2. What is a base class?

- Existing classes is called Base (Parent) Class.
- A class that is used as the basis for inheritance is called a superclass or base class.

3. Why derived class is called power packed class?

The derived class is a power packed class, as it can add additional attributes and methods and thus enhance its functionality.

4. In what multilevel and multiple inheritance differ though both contains many base class?

Multiple Inheritance: Inherits from multiple base classes (More than one Parent)

Multilevel Inheritance: Inherits from only one base class (Only one Parent)

5. What is the difference between public and private visibility mode?

public visibility mode	private visibility mode
When a base class is inherited with public visibility mode, the protected members of the base class will be inherited as protected members of the derived class and the public members of the base class will be inherited as 'public' members of the derived class.	When a base class is inherited with private visibility mode the public and protected members of the base class become 'private' members of the derived class

PART III
Answer to the all questions (3 Marks):

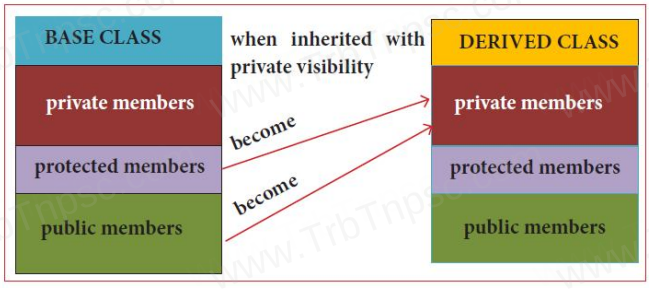
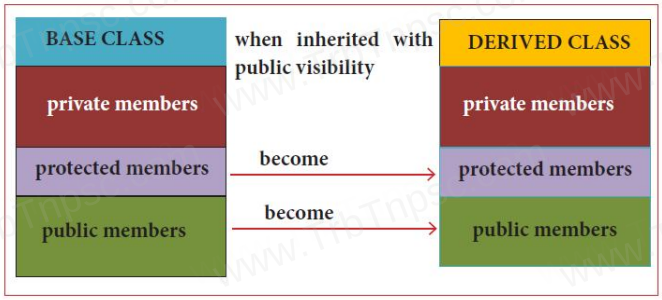
1. What are the points to be noted while deriving a new class?

The following points should be observed for defining the derived class.

- The keyword class has to be used
- The name of the derived class is to be given after thekeyword class
- A single colon (:)
- The type of derivation (the visibility mode), namely private, public or protected. If no visibility mode is specified ,then by default the visibility mode is considered as private.
- The names of all base classes(parent classes) separated by comma.

```
class derived_class_name :visibility_mode base_class_name
{
// members of derivedclass
    };
```

2. What is difference between the members present in the private visibility mode and the members present in the public visibility mode.

PRIVATE VISIBILITY MODE	PUBLIC VISIBILITY MODE
When a base class is inherited with private visibility mode the public and protected members of the base class become 'private' members of the derived class	When a base class is inherited with public visibility mode, the protected members of the base class will be inherited as protected members of the derived class and the public members of the base class will be inherited as public members of the derived class.
	

3. What is the difference between polymorphism and inheritance though are usedfor reusability of code?

Polymorphism	Inheritance
Polymorphism is a common interface of multiple forms.	Inheritance is a newly created class using existing class.
It support overloading (compile) and overriding (run).	It support reusability of code and reduce the size of the code.
Polymorphism implemented only on functions / methods.	Inheritance implemented only in classes.
There are 2 types.	There are 5 types.

4. What do you mean by overriding?

When a derived class member function has the same name as that of its base class member function, the derived class member function shadows/hides the base class's inherited function. This situation is called function overriding and this can be resolved by giving the base class name followed by :: and the member function name.

5. Write some facts about the execution of constructors and destructors in inheritance.

Some Facts About the execution of constructor in inheritance

- Base class constructors are executed first ,before the derived class constructors execution
- Derived class can not inherit the base class constructor but it can call the base class constructor by using

Base_class name::base_class_constructor() in derived class definition

- If there are multiple base classes ,then its start executing from the left most base class
- In multilevel inheritance, the constructors will be executed in the order of inheritance.

Some Facts About the execution of destructor in inheritance

- Own class(Derived) constructors are executed first ,before the Base class constructors execution
- Derived class can't inherit the base class destructor
- In multilevel inheritance, the destructor will be executed in the revise order of inheritance.

PART IV
Answer to the all questions (5 Marks):

1. Explain the different types of inheritance

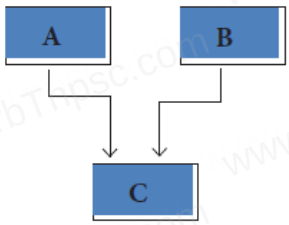
There are different types of inheritance viz.,

- Single inheritance
- Multiple inheritance
- Multilevel inheritance
- Hybrid inheritance
- Hierarchical inheritance

1. Single Inheritance

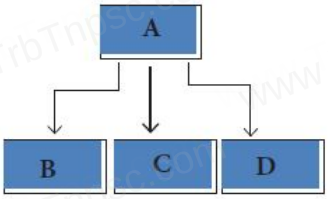
When a derived class inherits only from one base class, it is known as single inheritance

2. Multiple Inheritance



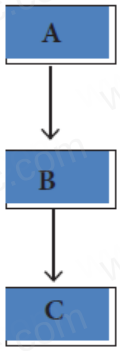
When a derived class inherits from multiple base classes it is known as multiple inheritance

3. Hierarchical inheritance



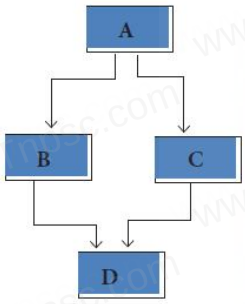
When more than one derived classes are created from a single base class , it is known as Hierarchical inheritance.

4. Multilevel Inheritance



The transitive nature of inheritance is itself reflected by this form of inheritance. When a class is derived from a class which is a derived class – then it is referred to as multilevel inheritance.

5. Hybrid inheritance



When there is a combination of more than one type of inheritance, it is known as hybrid inheritance.

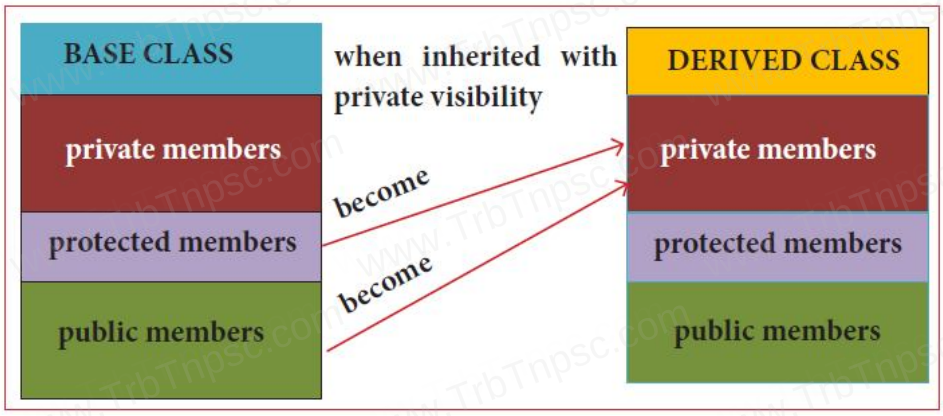
Hence, it may be a combination of Multilevel and Multiple inheritance or Hierarchical and Multilevel inheritance or Hierarchical, Multilevel and Multiple inheritance.

2. Explain the different visibility mode through pictorial representation

The accessibility of base class by the derived class is controlled by visibility modes. The three visibility modes are private, protected and public. The default visibility mode is private. Though visibility modes and access specifies look similar, the main difference between them is Access specifies control the accessibility of the members with in the class where as visibility modes control the access of inherited members with in the class.

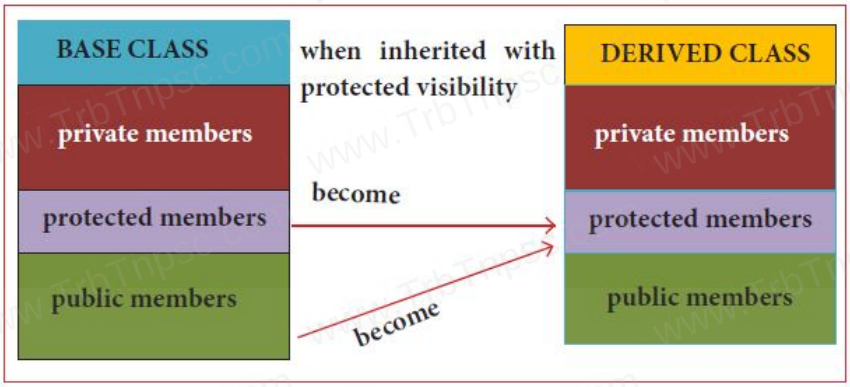
1 Private visibility mode

When a base class is inherited with private visibility mode the public and protected members of the base class become 'private' members of the derived class.



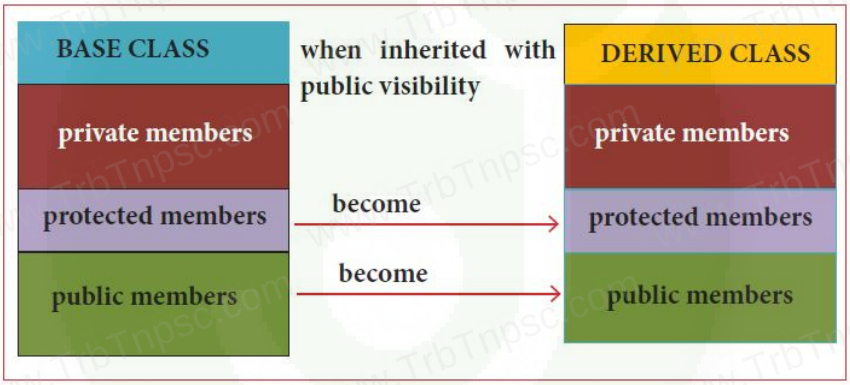
2 protected visibility mode

When a base class is inherited with protected visibility mode the protected and public members of the base class become 'protected members ' of the derived class.



3 public visibility mode

When a base class is inherited with public visibility mode , the protected members of the base class will be inherited as protected members of the derived class and the public members of the base class will be inherited as public members of the derived class.



3.

```
#include<iostream>
#include<string.h>
#include<stdio.h>
using name spacestd;
class publisher
{
char pname[15];
char hoffice[15];
char address[25];
double turnover;
protected:
char phone[3][1O];
void register();
public:
publisher();
~publisher();
void enter data();
void disp data();
};
class branch
{
charbcity[15];
char baddress[25];
protected:
intno_of_emp;
public:
charbphone[2][10];
branch();
~branch();
void have data();
void give data();
};
class author: public branch, publisher
{
intaut_code;
charaname[2O];
float income;
public:
author();
~author();
voidgetdata();
voidputdata();
};
```

Answer the following questions based on the above given program:

3.1. Which type of Inheritance is shown in the program?

Ans: Multiple inheritance

3.2. Specify the visibility mode of base classes.

Ans: public

3.3 Give the sequence of Constructor/Destructor Invocation when object of class author is created.

Ans: Constructors branch, publisher and author are executed

Destructors author, publisher and branch will be executed.

3.4. Name the base class(/es) and derived class (/es).

Ans: branch and publisher → Base classes

Author → Derived class

3.5 Give number of bytes to be occupied by the object of the following class:

(a) publisher : 93 bytes
(b) branch : 64 bytes
(c) author : 181 bytes

3.6. Write the names of data members accessible from the object of class author.

Ans: phone[3][10];

no_of_emp;

bphone[2][10];

3.7. Write the names of all member functions accessible from the object of class author.

Ans: enterdata();

dispdata();

havedata();

givedata();

getdata();

putdata();

3.8 Write the names of all members accessible from member functionsof class author.

Ans:

Data Members:	**Member Functions:**
income;	getdata();
aname[20];	havedata();
aut_code;	givedata();
no_of_emp;	register();
phone[3][10];	enterdata();
	dispdata();

4. Consider the following C++ code and answer the questions

```
class Personal
{
int Class,Rno;
char Section;
protected:
char Name[20];
public:
personal();
void pentry();
voidPdisplay();
};
class Marks:private Personal
{
float M{5};
protected:
char Grade[5];
public:
Marks();
void M entry();
void M display();
};
class Result:public Marks
{
float Total,Agg;
public:
char FinalGrade, Commence[20];
Result();
void R calculate();
void R display();
}:
```

4.1. Which type of Inheritance is shown in the program?

Multilevel Inheritance

4.2. Specify the visibility mode of base classes.

Private visibility - Marks class
Public visibility - Result class

4.3 Give the sequence of Constructor/Destructor Invocation when object of class Result is created.

Constructor : Personal, Marks, Result
Destructor : Result, Marks, Personal

4.4. Name the base class(/es) and derived class (/es).

Base classes : Personal & Marks
Derived classes : Marks & Result

4.5 Give number of bytes to be occupied by the object of the following class:

(a) Personal - 28 bytes
(b) Marks - 53 bytes
(c) Result - 82 bytes

{ using Dev C++ }

4.6. Write the names of data members accessible from the object of class Result.

FinalGrade, Commernce

4.7. Write the names of all member functions accessible from the object of class Result.

Rcalculate( ), Rdisplay( ) → Result class members
Mentry( ), Mdisplay( ) → Derived class members

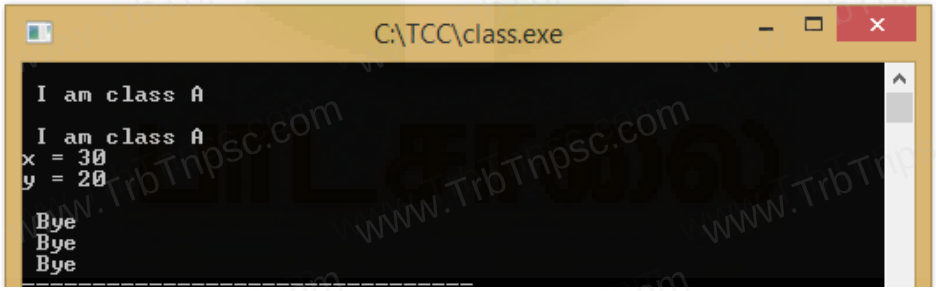
4.8 Write the names of all members accessible from member functions of class Result.

Total, Agg, FinalGrade, Commernce → Result class data members
M, Grade → Marks class data members

5. Write the output of the following program

```
#include<iostream>
using namespace std;
class A
{
protected:
int x;
public:
void show()
{
cout<<"x = "<<x<<endl;
}
A()
{
cout<<endl<<" I am class A "<<endl;
}
~A()
{
cout<<endl<<" Bye ";
}
};
class B : public A
{
{
protected:
int y;
public:
B(int x, int y)
{
this->x = x; //this -> is used to denote the
        objects datamember
this->y = y; //this -> is used to denote the
        objects datamember
}
B()
{
cout<<endl<<" I am class B "<<endl;
}
~B()
{
cout<<endl<<" Bye ";
}
void show()
{
cout<<"x = "<<x<<endl;
cout<<"y = "<<y<<endl;
}
};
int main()
{
A objA;
B objB(30, 20);
objB.show();
return 0;
}
```

Output:



6. Debug the following program

Output

15
14
13

Program :

```
%include(iostream.h)
#include<conio.h>
Class A
{
public;
int a1,a2:a3;
Void getdata[]
{
a1=15;
a2=13;a3=13;
}
}
Class B:: public A()
{
PUBLIC
voidfunc()
{
int b1:b2:b3;
A::getdata[];
b1=a1;
b2=a2;
a3=a3;
cout<<b1<<'\t'<<b2<<'t\'<<b3;
}
void main()
{
clrscr()
B der;
der1:func();
getch();
}
```

LINE NO	ERROR STATEMENT	CORRECTED STATEMENT	DESCRIPTION
2	%include(iostream.h)	#include<iostream.h>	Header file should start with #
3	Class A	class A	Keyword class should be in lower case
5	public;	public:	Access Specifier should contain : (Colon)
6	int a1,a2:a3;	int a1,a2,a3;	Every variable should be separated by comma
7	Void getdata[]	void getdata()	Keyword should be in lower case. Function contain ( )
13	Class B:: public A()	class b::public A()	Keyword should be in lower case.
13	Class B:: public A()	class b:public A()	Inheritance symbol is : (colon)
13	Class B:: public A()	class b:public A	Class A should not contain ( )
15	PUBLIC	public:	Access Specifier should contain : (Colon)
16	voidfunc()	void func()	Space should be allowed
18	int b1:b2:b3;	int b1,b2,b3;	Every variable should be separated by comma
19	A::getdata[];	void A::getdata()	Data type is missing
22	a3=a3;	b3=a3;	Wrong Assignment
27	clrscr()	clrscr();	Every statement should be terminated
29	der1:func();	der.func();	Object name is wrong. Dot operator is used to access the member function

Unit - V CHAPTER – 17

COMPUTER ETHICS AND CYBER SECURITY

PART I

Choose the correct answers

1. Which of the following deals with procedures, practices and values?
   a. piracy b. programs c. virus **d. computer ethics**

2. Commercial programs made available to the public illegally are known as
   a. freeware **b. warez** c. free software d. software

3. Which one of the following are self-repeating and do not require a computer program to attach themselves?
   a. viruses **b. worms** c. spyware d. Trojans

4. Which one of the following tracks a user visits a website?
   a. spyware **b. cookies** c. worms d. Trojans

5. Which of the following is not a malicious program on computer systems?
   a. worms b. Trojans c. spyware **d. cookies**

6. A computer network security that monitors and controls incoming and outgoing traffic is
   a. Cookies b.Virus **c. Firewall** d. worms

7. The process of converting cipher text to plain text is called
   a. Encryption **b. Decryption** c. key d. proxy server

8. e-commerce means
   a. electronic commerce b. electronic data exchange
   c. electric data exchange d. electronic commercialization.

9. Distributing unwanted e-mail to others is called.
   a. scam **b. spam** c. fraud d. spoofing

10. Legal recognition for transactions are carried out by
   a. Electronic Data Interchange b. Electronic Data Exchange
   c. Electronic Data Transfer d. Electrical Data Interchange

PART II

Answer to the all questions (2 Marks)

1. What is harvesting?

A person or program collects login and passwordinformation from a legitimate user to illegally gainaccess to others' account(s).

2. What are Warez?

Commercial programs that are made available to the public illegally are often called warez.

3. Write a short note on cracking.

Cracking is where someone edits a program source so that the code can be exploited or modified. A cracker (also called a black hat or dark side hacker) is a malicious or criminal hacker. “Cracking” means trying to get into computer systems in order to steal, corrupt, or illegitimately view data.

4. Write two types of cyber attacks.

1. Virus
2. Worms
3. Spyware
4. Ransomware

5. What is a cookie?

A cookie is a small piece of data sent from a website and stored on the user's computer memory (Hard drive) by the user's web browser while the user is browsing internet.

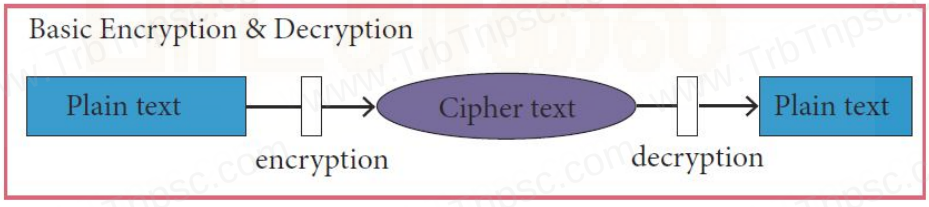
PART III
Answer to the all questions (3 Marks)

1. What is the role of firewalls?

- A firewall is a computer network security based system that monitors and controls incoming and outgoing network traffic based on predefined security rules.
- A firewall commonly establishes a block between a trusted internal computer network and entrusted computer outside the network.

2. Write about encryption and decryption.

- Encryption is the process of translating the plain text data (plaintext) into random and mangled data (called cipher-text).
- Decryption is the reverse process of converting the cipher-text back to plaintext. Encryption and decryption are done by cryptography.



3. Explain symmetric key encryption.

- Symmetric encryption is a technique to use the same key for both encryption and decryption.
- The main disadvantage of the symmetric key encryption is that all authorized persons involved, have to exchange the key used to encrypt the data before they can decrypt it.
- If anybody intercepts the key information, they may read all message.

4. What are the guidelines to be followed by any computer user?

To protect the information the following points to be noted:

- Complex password setting can make your surfing secured.
- When the internet is not in use, disconnect it.
- Do NOT open spam mail or emails that have an unfamiliar sender.
- When using anti-virus software, keep it up-to-date.

5. What are ethical issues? Name some.

An Ethical issue is a problem or issue that requires a person or organization to choose between alternatives that must be evaluated as right (ethical) or wrong (unethical). These issues must be addressed and resolved to have a positive influence in society.

Some of the common ethical issues are listed below:

- Cyber crime
- Software Piracy
- Unauthorized Access
- Hacking
- Use of computers to commit fraud
- Sabotage in the form of viruses
- Making false claims using computers

PART IV

Answer to the all questions (5 Marks)

1. What are the various crimes happening using computer?

Cybercrime is an intellectual, white-collar crime. Those who commit such crimes generally manipulate the computer system in an intelligent manner.

For example – illegal money transferviainternet.

Examples of some Computer crimes and their functions are listed below following table.

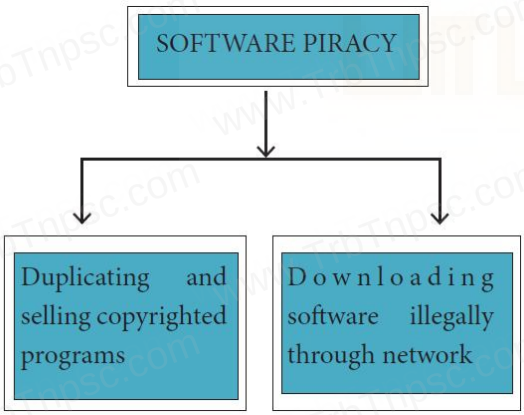
Crime	Function
Crime Function	Hacking, threats, and blackmailing towards a business or a person.
Cyber stalking	Harassing through online.
Malware	Malicious programs that can perform a variety of functions including stealing, encrypting or deleting sensitive data, altering or hijacking core computing functions and monitoring user's computer activity without their permission.

Denial of service attack	Overloading a system with fake requests so that it cannot serve normal legitimate requests.
Fraud	Manipulating data, for example changing the banking records to transfer money to an unauthorized account.
Harvesting	A person or program collects login and passwordinformation from a legitimate user to illegally gainaccess to others' account(s).
Identity theft	It is a crime where the criminals impersonate individuals, usually for financial gain.
Intellectual property theft	Stealing practical or conceptual information developed by another person or company.
Salami slicing	Stealing tiny amounts of money from each transaction.
Scam	Tricking people into believing something that isnot true.
Spam	Distribute unwanted e-mail to a large number ofinternet users.
Spoofing	It is a malicious practice in which communication is send from unknown source disguised as a source known to the receiver.

2. What is piracy? Mention the types of piracy? How can it be prevented?

Software Piracy is about the copyright violation of software created originally by an individual or an institution. It includes stealing of codes / programs and other information illegally and creating duplicate copies by unauthorized means and utilizing this data either for one's own benefit or for commercial profit.

In simple words, Software Piracy is "unauthorized copying of software". The following Figure shows a diagrammatical representation of software piracy.



Most of the commercial software is licensed for use at a single computer site or for use by only one user at any time. When a user buys any software, he becomes a licensed user for that software. He is allowed to make copies of the program for backup purposes, but it is against the law to distribute duplicate copies to others. Such illegal copying and distribution of commercial software should not be practiced.

An entirely different approach to software piracy is called shareware, acknowledges the futility of trying to stop people from copying software and instead relies on people's honesty. Shareware publishers encourage users to give copies of programs to friends and colleagues but ask everyone who uses that program regularly to pay a registration fee to the program's author directly. Commercial programs that are made available to the public illegally are often called warez.

3. Write the different types of cyber attacks.

Malware is a type of software designed through which the criminals gain illegal access to software and cause damage. Various types of cyber-attacks and their functions are given in the following Table.

S.No.	Cyber Attack	Function
1.	Virus	A virus is a small piece of computer code that can repeat itself and spreads from one computer to another by attaching itself to another computer file. One of the most common virus is **Trojan.** A Trojan virus is a program that appears to perform one function (for example, virus removal) but actually performs malicious activity when executed.
2.	Worms	Worms are self- repeating and do not require a computer program to attach themselves. Worms continually look for vulnerabilities and report back to the author of the worm when weaknesses are discovered.
3.	Spyware	Spyware can be installed on the computer automatically when the attachments are open, by clicking on links or by downloading infected software.
4.	Ransomware	Ransomware is a type of malicious program that demands payment after launching a cyber-attack on a computer system. This type of malware has become increasingly popular among criminals and costs the organizations millions each year.

Unit - V

CHAPTER – 18

TAMIL COMPUTING

PART I

Answer to the all questions (2 Marks)

1. List of the search engines supporting Tamil.

Google and Bing provide searching facilities in Tamil, which means you can search everything through Tamil.

A Google search engine gives you an inbuilt Tamil virtual keyboard.

2. What are the keyboard layouts used in Android?

Sellinam and Ponmadal – are familiar Tamil keyboard layouts that works on Android operating system in Smart phone using phonetics.

3. Write a short note about Tamil Programming Language.

Based on Python programming language, the first Tamil programming language "Ezhil" (**எழில்**) is designed. With the help of this programming language, you can write simple programs in Tamil.

4. What TSCII?

TSCII (Tamil Script Code for Information Interchange) is the first coding system to handle our Tamil language in an analysis of an encoding scheme that is easily handled in electronic devices, including non-English computers.

This encoding scheme was registered in IANA (Internet Assigned Numbers Authority) unit of ICANN.

5. Write a short note on Tamil Virtual Academy.

- With the objectives of spreading Tamil to the entire world through internet, Tamil Virtual University was established on 17th February 2001 by the Govt. of Tamilnadu.
- Now, this organisation functioning with the name "Tamil Virtual Academy". This organisation offers different courses regarding Tamil language, Culture, heritage etc., from kindergarten to under graduation level.

Website: http://www.tamilvu.org/index.php