Tamil Computing

18.1 Introduction

" பிறநாட்டு நல்லறிஞர் சாத்திரங்கள்
தமிழ்மொழியிற் பெயர்த்தல் வேண்டும்;
இறவாத புகழுடைய புதுநூல்கள்
தமிழ்மொழியில் இயற்றல் வேண்டும்;
மறைவாக நமக்குள்ளே பழங்கதைகள்
சொல்வதிலோர் மகிமை இல்லை;
திறமான புலமையெனில் வெளிநாட்டோர்;
அதை வணக்கஞ் செய்தல் வேண்டும்."

- மகாகவி பாரதி

Human civilization developed with the innovation of computer in the twentieth century. Computer development began as a early calculating tool and has now become a essential ingredient for gigantic growth for the existence of human life without computers.

It is true that any language will be outdated when it does not have the ability to adapt itself to the changing technologies. Tamil is a living language for thousands of years. Development of modern technologies, does not affect the growth of classical Tamil as it is ready to adopt the growing technological changes. **Tamil is not just a language, it is our identity, our life and our sense.**

"எங்கள் வாழ்வும், எங்கள் வளமும் மங்காத தமிழென்று சங்கே முழங்கு" – புரட்சி கவி.

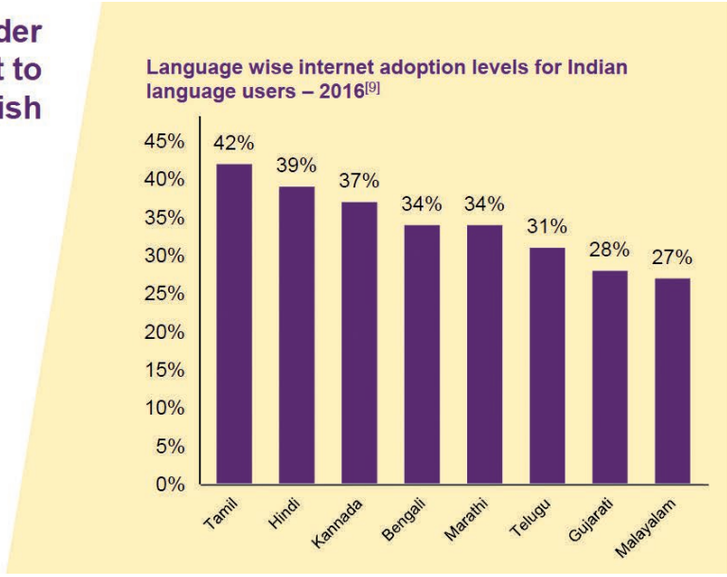
18.2 Tamil in Internet

We know that the internet today plays a vital role in every man's life. Internet is the best information technological device, through which we get know information.

In 2017 a study conducted by KPMG a Singapore based organization along with google, reported that, Tamil topped the list, among the most widely used languages in India, where 42% are using the Internet in Tamil

68%[9] Internet users consider local language digital content to be more reliable than English

Currently, Tamil (42%[9]) has the highest internet adoption levels followed by Hindi and Kannada among the Indian language users

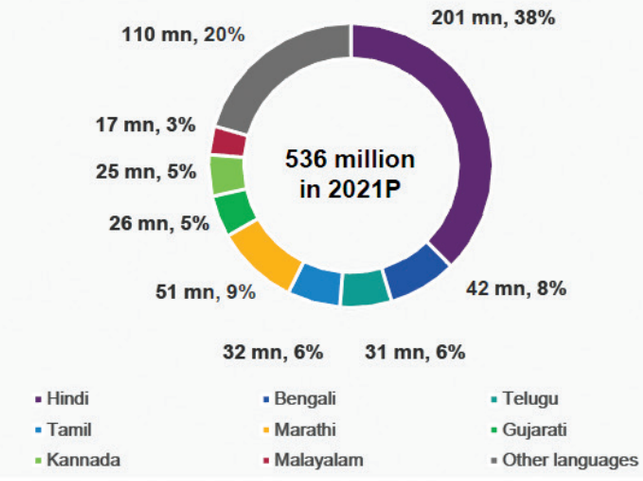


As per study, by 2021, 74% of people in India will access internet using Tamil and it will be in the top usage of Internet in India.

By 2021, the number of Hindi internet users will be more than English users

Marathi, Bengali, Tamil and Telugu internet users are expected to form 30%[12] of the total Indian language internet user base

Tamil and Kannada speakers have the highest propensity to adopt internet in future with the Indian language enablement of the ecosystem



Language	Adoption propensity
Hindi	54%
Bengali	46%
Telugu	60%
Tamil	74%
Marathi	43%
Gujarati	43%
Kannada	74%
Malayalam	44%
Other languages	NA*

* Propensity to adopt internet in future has been ascertained for select 8 Indian languages

These statistical data will be useful to improve internet services in Tamil.

18.3 Search Engines in Tamil

The "Search Engines" are used to search any information from the cyber space. Although there are many search engines, but only a few of them are frequently in use. In the top ten search engines, Google, Bing and Yahoo take first three places respectively. Google and Bing provide searching facilities in Tamil, which means you can search everything through Tamil. The Google search engine gives you an inbuilt Tamil virtual keyboard.

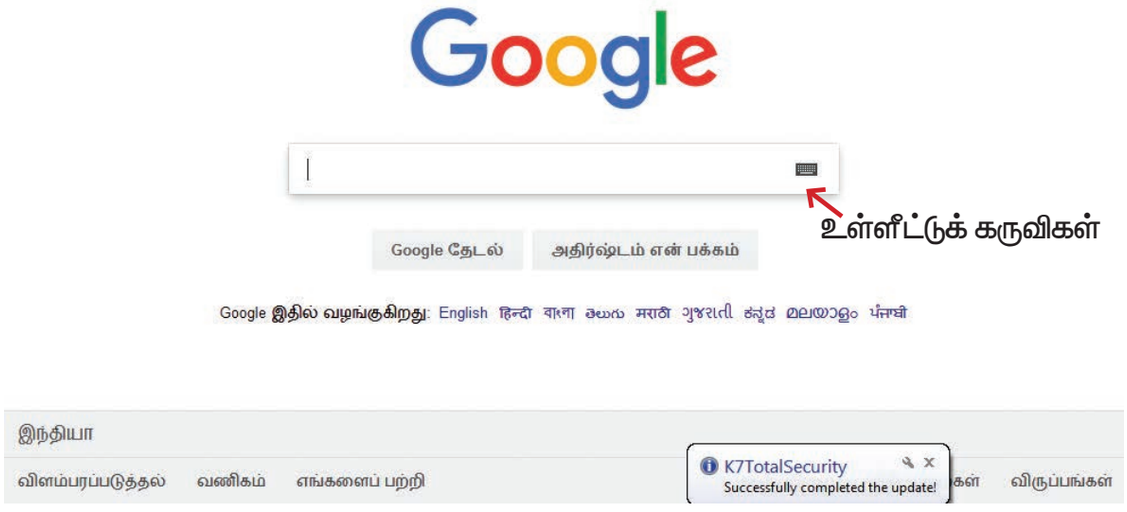


Figure 18.1(a) Google Search Engine (India)

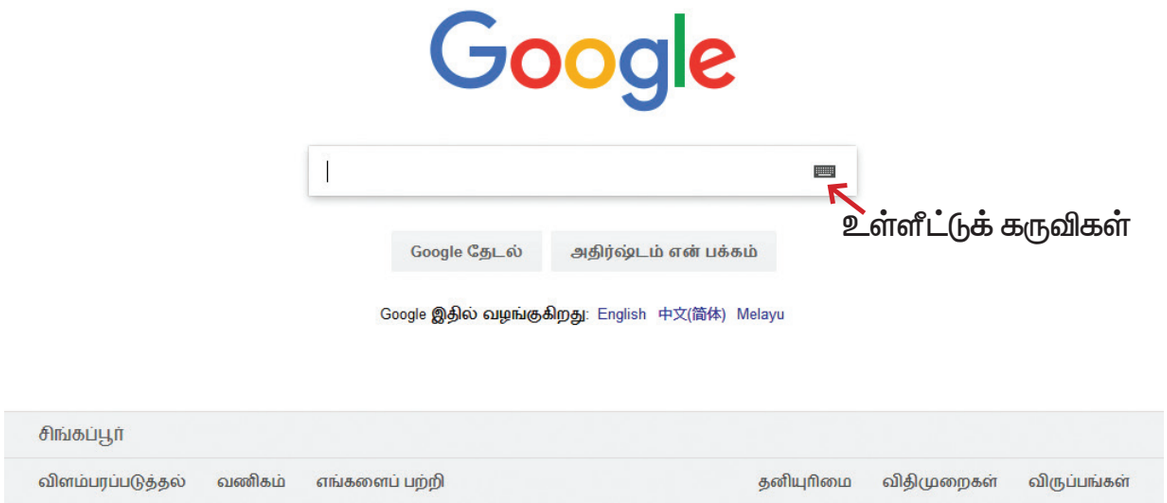


Figure 18.1(b) Google Search Engine (Singapore)

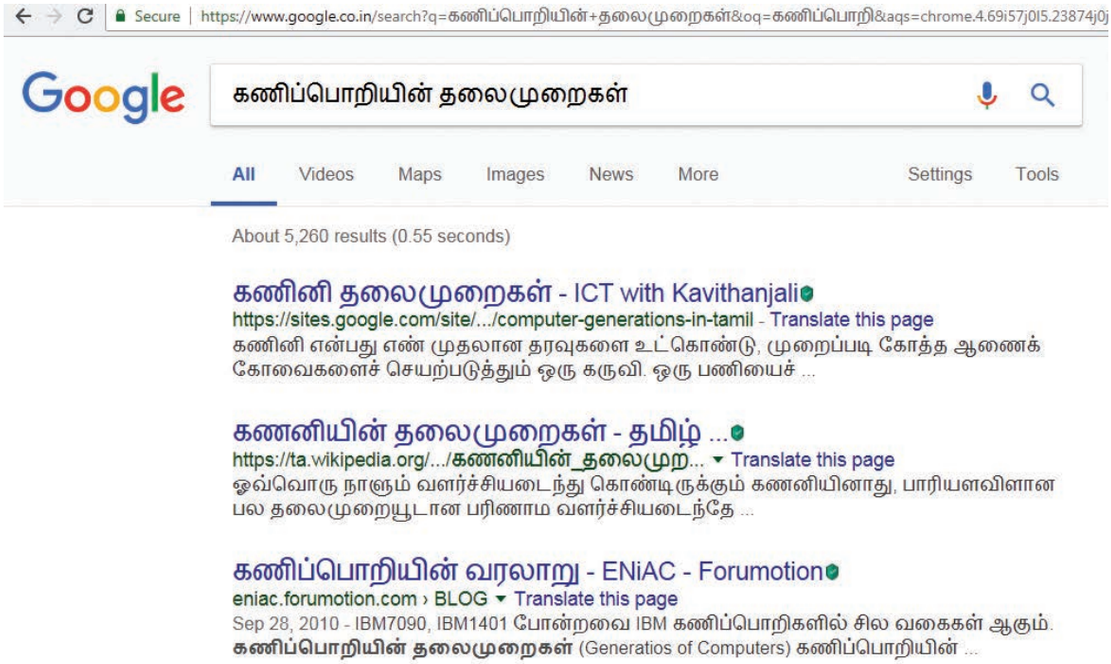


Figure 18.2 Searching in Tamil

18.4 e – Governance:

Getting Government services through internet is known as e-Governance. Govt. of Tamilnadu has been giving its services through Internet. One can communicate with Govt. of Tamilnadu from any corner of the World. One can get important announcements, government orders, and government welfare schemes from the web portal of Govt. of. Tamilnadu.

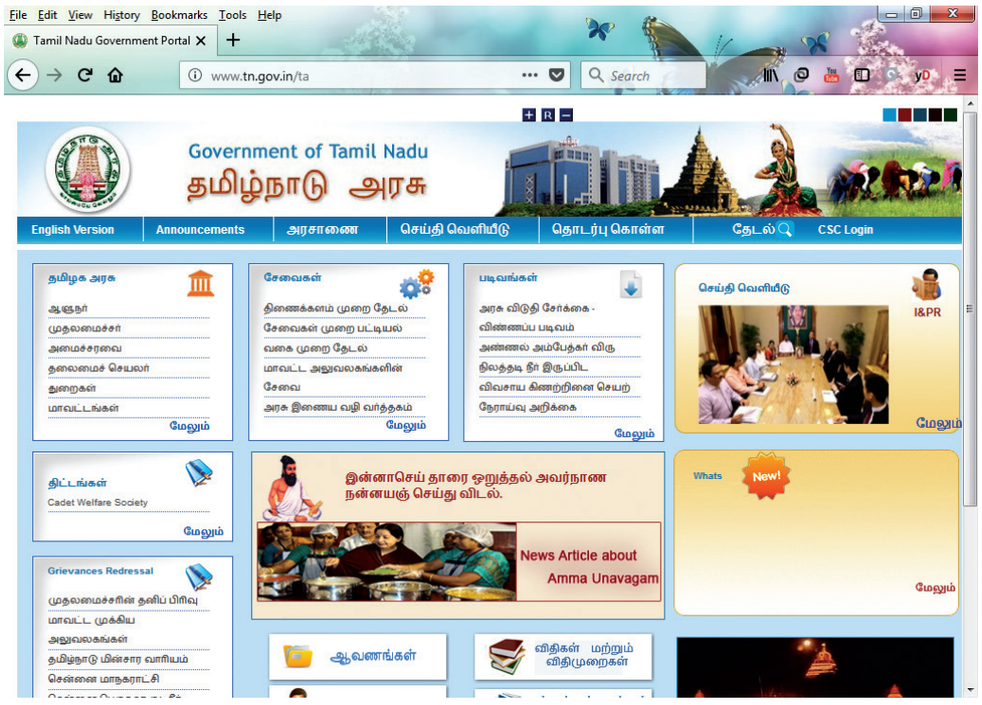


Figure 18.3 Official Website of Govt. of Tamilnadu

E-Governance through Tamil	Web Address
Official Website of Govt. of Tamilnadu	http://www.tn.gov.in/ta
Department of Agricultural Engineering	http://www.aed.tn.gov.in/
Department of Environment	http://www.environment.tn.nic.in/
Directorate of Govt. Examinations	http://www.dge.tn.nic.in/
Tamilnadu Health Department	http://www.tnhealth.org/
Tamilnadu Micro, Small and Medium Enterprises Department	http://www.msmeonline.tn.gov.in/
Rural Development and Panchayat Raj Department	http://www.tnrd.gov.in/
Backward, Most Backward and Minorities Welfare Department	http://www.bcmbcmw.tn.gov.in/
Tamilnadu Forest Department	https://www.forests.tn.gov.in/
Hindu Religious and Charitable Endowments Department.	http://www.tnhrce.org/
Tamil Nadu Public Service Commission (TNPSC)	http://www.tnpsc.gov.in/tamilversion/index.html
Official Website of Govt. of Srilanka	https://www.gov.lk/index.php

Outside India, Government of Srilanka provides all their services through the official website in Tamil.

18.5 e-Library

E-Libraries are portal or website of collection of e-books. Tamil e-Library services provide thousands of Tamil Books as ebooks mostly at free of cost. It is the most useful service to Tamil people who live far away from their home land.

Tamil e-Library	Website address
Tamilnadu School Education and Teacher Education Training Textbooks and Resource Books	http://www.textbooksonline.tn.nic.in/
Tamil Virtual Academy	http://www.tamilvu.org/library/libindex.htm
Connemara Public Library	http://connemarapubliclibrarychennai.com/Veettukku_oru_noolagam/index.html
Tamil Digital Library	http://tamildigitallibrary.in/
Chennai Library	http://www.chennailibrary.com/
Thamizhagam	http://www.thamizhagam.net/parithi/parithi.html

Project Madurai	http://www.projectmadurai.org/pmworks.html
Old Books and Manuscripts	http://www.tamilheritage.org/old/text/ebook/ebook.html
Noolaham	http://www.noolaham.org/wiki/index.php/
Anna Centenary Libraray	http://www.annacentenarylibrary.org/

18.6 Tamil Typing and Interface software

Tamil is mostly used to type documents in word processors and search information on the internet. Typing Tamil using Tamil interface software is a familiar one among the different methods of typing. This is the simplest method of typing Tamil in both Computer and Smart phones.

18.6.1 Familiar Tamil Keyboard Interface:

- NHM Writer, E-Kalappai and Lippikar – are familiar Tamil keyboard interfaces software that is used for Tamil typing which works on Tamil Unicode, using phonetics.
- Sellinam and Ponmadal – are familiar Tamil keyboard layouts that works on Android operating system in Smart phone using phonetics.

Figure 18.4 eKalappai Opening screen

18.7 Tamil Office Automation Applications

Famous Office automation software like Microsoft Office, Open Office etc., provides complete Tamil interface facility. These softwares are downloadable and installed in your computer. After installation, your office automation software environment will completely

change to Tamil. Menu bars, names of icons, dialog boxes will be shown in Tamil. Moreover, you can save files with Tamil names and create folders with Tamil names.

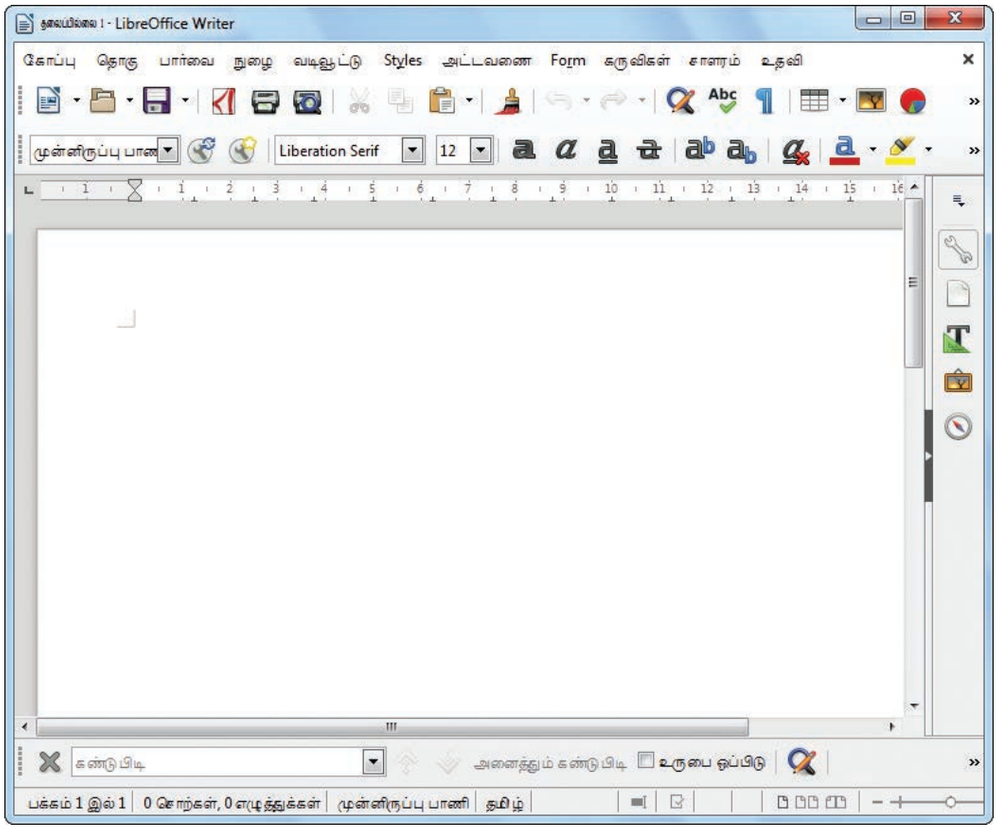


Figure 18.5 Libra Office Writer Environments in Tamil

Apart from that Tamil Libra Office, Tamil Open Office, Azhagi Unicode Editor, Ponmozhi, Menthamiz, Kamban, Vani are office automation software working exclusively for Tamil. You can use these applications to work completely in Tamil.

18.8 Tamil Translation Applications

Thamizpori (தமிழ்பொறி) is a Tamil tranlation application having more than 30000 Tamil words equalent to English words. Using this application, we can translate small english sentences into Tamil. Google also gives an online translation facility, using this online facility we can translate from Tamil to any other language and vice versa.

18.9 Tamil Programming Language

Programming languages to develop software in computers and smart phones are available only in English. Now, efforts are taken to develop programming languages in Tamil. 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.

18.10 Tamil Information Interchange Coding Systems

TSCII (Tamil Script Code for Information Interchange)

Computers handle data and information as binary system. Every data should be converted into binary when it is fed into a computer system. You have learnt about all these things in the first unit of this text book. Computers use ASCII encoding system to handle data and information. The ASCII encoding system is applicable only for handling English language. Therefore, 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) a unit of ICANN.

ISCII (Indian Script Code for Information Interchange)

This is one of the encoding schemes specially designed for Indian languages including Tamil. It was unified with Unicode.

Unicode:

Unicode is an encoding system, designed to handle various world languages, including Tamil. Its first version 1.0.0 was introduced in October 1991. When Unicode was introduced it could handle nearly 23 languages including Tamil. Among the various encoding scheme, Unicode is the best suitable to handle Tamil.

18.11 Tamil Operating System

An operating system is needed to access electronic systems such as computer and smart phone. Microsoft Windows is very popular operating system for personal computers. Linux is another popular open source operating system. Operating systems are used to access a computer easily. An operating system should be easy to work and its environment should be in an understandable form. Thus, all operating systems used in computers and smart phones are offered in Tamil environment.

Windows Tamil Environment interface should be downloaded and installed from the internet. It displays all window elements such as Taskbar, desktop elements, names of icons, commands in Tamil.

18.12 Organisation and projects to develop Tamil

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 functions with the name of "Tamil Virtual Academy". It offers different courses in Tamil language, Culture, heritage etc., from kindergarten to under graduation level.

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

Tamil Language Council, Singapore

With the objectives of promoting the awareness and greater use of Tamil among the Singaporeans, in 2001 the council of Tamil Language was formed by the ministry of Information Communications and Arts, Govt. of Singapore. The council is called as "வளர்தமிழ் இயக்கம்".

Website: http://tamil.org.sg/ta

Madurai Project

Project Madurai is an open and voluntary initiative to collect and publish free electronic editions of ancient tamil literary classics. This means either typing-in or scanning old books and archiving the text is one of the most readily accessible formats for use on all popular computer platforms.

Since its launch in 1998, Project Madurai etexts released are in Tamil script form as per TSCII encoding. Since 2004 we have started releasing etexts in Tamil unicode as well.

Web Site: http://www.projectmadurai.org/

Tamil Wikipedia:

Wikipedia is a open source encyclopedia where any person can write an article about any subject. There are more than One lakh articles in Tamil Wikipedia.

Web Site: https://ta.wikipedia.org/

In order to make Tamil as a living language, it is the duty of every Tamilian to actively use Tamil in the development of technology.

Points to Remember:

- Tamil topped the list of the most widely used regional languages in India by the end of 2016, among 42% are using the Internet.
- Google and Bing provide searching facilities in Tamil.
- Getting Government services through internet is known as e-Governance.
- Tamil e-Library services provide thousands of Tamil Books as ebooks mostly at free of cost.
- Thamizpori (தமிழ்பொறி) is a Tamil tranlation application having more than 30000 Tamil words equalent to English words.
- The first Tamil programming language is "Ezhil" (எழில்)
- Unicode is an encoding system, designed to handle various world languages, including Tamil.
- Windows Tamil Environment interface should be downloaded and installed from internet.

Evaluation

Very Short Answers

1. List the search engines supported by Tamil language.
2. What are the keyboard layouts used in Android?
3. Write a short note about Tamil Programming Language.
4. What is TSCII?
5. Write a short note on Tamil Virtual Academy.

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FE8KPQ

WORD	***MEANING***
Paradigm	Organizing principle of a program.
Abstraction	Abstraction refers to showing only the essential features without revealing background details
Modularity	Designing a system that is divided into a set of functional units (named modules) that can be composed into a larger application.
Base class	A class whose properties are inherited by other newly created classes .Also called as parent class
Derived class	A class which inherits the properties of the base class. Also called as child class or subclass.
Class	Class represents a group of similar objects that share common properties
Object	Identifiable entity with some characteristics and behaviour
Encapsulation	Mechanism by which the data and function sare bound together into a single unit
Inheritance	Process of creating new classes called derived classes, from the existing or base classes.
Signature	Number of argument and type of argument
Polymorphism	many forms
Default argument	Initializing the argument with a value
Base Class:	A class from which another class inherits (Also called Super class or parent class)
Derived Class:	A class inheriting properties from another class. (Also called Sub class)
Inheritance	The process of one class to inherit properties from another class
Inheritance Hierarchy (Inheritance Path):	The chain depicting relationship between a base class and the derived class (Also called Derivation Hierarchy)
Visibility mode	The public, private or protected specifier that controls the visibility and availability of a member in a class
Vulnerability	The possibility of being attacked or harmed.
Ethics	Moral principles that govern a person's behaviour or the conducting of an activity.

Cyber	Characteristic of the culture of computers, information technology, and virtual reality.
Computer Crime	Computer crime is an intellectual crime to manipulate computer system.
Authenticity	The quality of being real or true.
Sabotage	Deliberately destroy, damage, or obstruct.
Perpetrator	A person who carries out a harmful, illegal, or immoral act.
Software Piracy	Software Piracy is the copyright violation of software created originally by one person and illegally used by someone else.
Hacking	Hacking is gaining unauthorized access to computer system without the owner's permission.
Cracking	Cracking is gaining unauthorized access to computer systems to commit a crime, such as stealing the code to make a copy-protected program run thus denying service to legitimate users.
Malicious	Intentionally doing harm.
Freeware	Freeware is a software available free of charge.
Shareware	Shareware is a software that is distributed free of charge on a trial basis for a limited time.
Phishing	Phishing is a term used to describe a malicious individual or group of individuals who scam users by sending e-mails or creating web pages that are designed to collect an individual's online bank, credit card, or other login information.
Fraudulent	Dishonest, cheating, swindling, corrupt, criminal, illegal, unlawful.
Anonymous	Unnamed, nameless, unidentified, unspecified.
Cookies	Cookies are messages that web servers pass to your web browser when you visit Internet sites
Tampering	Interfere in order to cause damage.
Immune	Resistant to a particular infection or toxin.
Firewall	A firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules.
Proxy server	A proxy server is a gateway between a local network and a larger-scale network such as the Internet. Proxy servers provide increased performance and security.
Encryption	Encryption is the process of encoding a message or information so that only authorized users can decrypt it
Decryption	Decryption is theprocess of decoding the encrypted text by converting it back into normal text.

PRACTICAL COMPUTER SCIENCE 11

Instructions:

1. Ten exercises from C++ are practiced in the practical classes
2. One question from C++ with internal choice
3. Distribution of Marks

I. Internal Assessment:	5 Marks
Record Book	5 Marks

II. External Assessment:	15 Marks
(a) C++ Program coding	10 Marks
(b) Execution & Output	5 Marks
Total	**20 Marks**

INDEX

CS-1 **Write a C++ program to input basic salary of an employee and calculate its Gross salary according to following:**

Basic Salary <25000 : HRA = 20%, DA = 80%
Basic Salary >= 25000 : HRA = 25%, DA = 90%
Basic Salary >= 40000 : HRA = 30%, DA = 95%

Coding

```
#include <iostream>
using namespace std;
int main()
{
float basic, gross, da,hra;
cout<<"Enter basic salary of an employee: ";
cin>>basic;
if (basic <25000)
{
da = basic *80/100;
hra= basic *20/100;
}
else if (basic >=25000 && basic<40000)
{
da = basic *90/100;
hra= basic *25/100;
}
else if (basic>=40000)
{
da = basic *95/100;
hra= basic *30/100;
}
gross= basic +hra+ da;
cout<< "\n\t Basic Pay ....."<< basic<<endl;
cout<< "\t Dearness Allowance ....." << da <<endl;
cout<< "\t House Rent Allowance....."<< hra <<endl;
 cout<< "\t ----------------------------------------"<<endl;
 cout<< "\t Gross Salary....."<<gross <<endl;
```

```
cout<< "\t ----------------------------------------"<<endl;
return 0;
}
```

Output

```
Enter basic salary of an employee: 25000
                    Basic Pay       : 25000
          Dearness Allowance        : 22500
       House Rent Allowance         :   6250
                    ------------------------
               Gross Salary         : 53750
                    ------------------------
```

CS2 - PERCENTAGE

CS-2 **Write a C++ program to check percentage of a student and display the division (distinction, first, second, third or fail) scored using switch case**

Percentage	Division
>=80	Distinction
>=60 and <80	First division
>=50 and <60	Second Division
>=40 and <50	Third Division
<40	Fail

Coding

```
#include <iostream>
using namespace std;
int main()
{
float percent;
int x;
cout<<"Enter your percentage: ";
cin>>percent;
cout<<"You scored "<<percent<<"%"<<endl;
   x = percent/10;
switch (x)
{
case 10:
case 9:
```

```
case 8:
cout<<"You have passed with Distinction";
break;
case 7:
case 6:
cout<<"You have passed with First division";
break;
case 5:
cout<<"You have passed with Second division";
break;
case 4:
cout<<"You have passed with Third division";
break;
default:
cout<<"Sorry: You have failed";
}
return 0;
}
```

Output 1

```
Enter your percentage: 79
You scored 79%
You have passed with First division
```

Output 2

```
Enter your percentage: 39
You scored 39%
Sorry: You have failed
```

CS3 - PALINDROME

CS-3 **Write a C++ program to enter any number and check whether the number is palindrome or not using while loop.**

Coding

```
#include <iostream>
using namespace std;
int main()
{
int n,num, digit, rev =0;
cout<<"Enter a positive number: ";
```

```
cin>>num;
    n =num;
while (num)
{
digit=num%10;
rev=(rev *10)+ digit;
num=num/10;
}
cout<<" The reverse of the number is: "<< rev <<endl;
if (n == rev)
cout<<" The number is a palindrome";
else
cout<<" The number is not a palindrome";
return 0;
}
```

Output 1

```
Enter a positive number to reverse: 1234
 The reverse of the number is: 4321
 The number is not a palindrome
```

Output 2

```
Enter a positive number to reverse: 1221
The reverse of the number is: 1221
The number is a palindrome
```

CS4 - NUMBER CONVERSION

CS-4 **Using do while loop create the following menu based C++ program**

1.Convert a Decimal to binary number
2.Convert a binary number to Decimal
3. Exit

Depending on the choice accept the value and display the result .The program should continue till the userselect the third option

Coding

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
```

```
    int dec,d,i,temp,ch;
    long int bin;
do
{
    dec=bin=d=i=0;
    cout<<"\n\n\t\tMENU\n1. Decimal to Binary number\n2.Binary to Decimal number\
    n3.Exit\n";
    cout <<"Enter your choice(1/2/3)";
    cin>>ch;
    switch (ch)
    {
            case 1:  cout << "Enter a decimal number: ";  cin >> dec;
                    temp=dec;
    while (dec!=0)
    {
    d = dec%2;
    bin += d * pow(10,i);
    dec /= 2;
    i++;
}
    cout << temp << " in decimal = " << bin << " in binary" << endl ;break;
    case 2: cout << "Enter a binary number: ";    cin >> bin;
            temp=bin;
            while (bin!=0)
    {
    d = bin%10;
    dec += d*pow(2,i);
    bin /= 10;
    i++;
}
    cout << temp << " in binary = " <<dec << " in decimal";
    break;
    case 3: break;
    default : cout<<"Invalid choice";
 }
} while (ch!=3);
return 0;
}
```

Output 1

```
    MENU
1.Decimal to Binary number
```

2.Binary to Decimal number
3.Exit
Enter your choice(1/2/3)1
Enter a decimal number: 23
23 in decimal = 10111 in binary
MENU
1.Decimal to Binary number
2.Binary to Decimal number
3.Exit
Enter your choice(1/2/3)2
Enter a binary number: 11001
11001 in binary = 25 in decimal
MENU
1.Decimal to Binary number
2.Binary to Decimal number
3.Exit
Enter your choice(1/2/3)3

Output 2

MENU
1.Decimal to Binary number
2.Binary to Decimal number
3.Exit
Enter your choice(1/2/3)4
Invalid choice
MENU
1.Decimal to Binary number
2.Binary to Decimal number
3.Exit
Enter your choice(1/2/3)3

CS5 - FIBONACCI PRIME SERIES

CS-5 **Write a C++ program using a user defined function to generate the Fibonacci series till n terms and print if each term is prime or Composite.**

Coding

```
#include <iostream>
#include <stdlib.h>
```

```
using namespace std;
void Primechk (int a )
{ int j;
    if ( a == 0 || a == 1 )
   { cout<< "  NEITHER PRIME NOR COMPOSITE ";}
    else
{
   for (j = 2 ; j<a; j++)
   {         if (a%j==0)
   { cout<< "\tCOMPOSITE" ;
   break ;
}
   }
    if ( a==j )
    cout<< "\tPRIME" ;
   }
}
   void  fibo ( int n )
   { int a = -1 , b = 1 ,c=0 ;
   for ( int i = 1 ; i <= n ; i++)
   {
            cout<<endl;
   c = a + b ;
   cout<<c;
   Primechk(c);
   a = b;
   b = c ;
    }
   }
 int main ()
 {
   int n ;
   cout << " ENTER THE NUMBER OF REQUIRED FIBO TERMS " ;
   cin >> n ;
   cout<< "\n\tFIBONACCI SERIES\n " ;
   fibo (n) ;
return 0;
  }
```

Output

```
ENTER THE NUMBER OF TERMS 10
   FIBONACCI SERIES
0  NEITHER PRIME NOR COMPOSITE
1  NEITHER PRIME NOR COMPOSITE
1  NEITHER PRIME NOR COMPOSITE
2       PRIME
3       PRIME
5       PRIME
8       COMPOSITE
13       PRIME
21       COMPOSITE
34       COMPOSITE
```

CS6 - INSERT / DELETE ELEMENTS IN AN ARRAY

CS-6 **Write a menu driven C++ program to Insert and Delete elements in a single dimension array of integers and print the array after insertion or deletion**

Coding

```
#include<iostream>
using namespace std;
int a[20],b[20],c[40];
int m,n,p,val,i,j,key,pos,temp;
/*Function Prototype*/
void display();
void insert();
void del();
int main()
{
int choice;
cout<<"\nEnter the size of the array elements:\t";
cin>>n;
cout<<"\nEnter the elements for the array:\n";
for (i=0;i<n;i++)
```

```
{
cin>>a[i];
}
do {
cout<<"\n\n--------Menu-----------\n";
cout<<"1.Insert\n";
cout<<"2.Delete\n";
cout<<"3.Exit\n";
cout<<"----------------------";
cout<<"\nEnter your choice:\t";
cin>>choice;
switch (choice)
{
   case 1: insert();
   break;
   case 2: del();
   break;
   case 3:break;
   default :cout<<"\nInvalid choice:\n";
}
} while (choice!=3);
return 0;
}
void display()//displaying an array elements
{
   int i;
   cout<<"\nThe array elements are:\n";
   for(i=0;i<n;i++)
{
   cout<<a[i]<<" ";
}
}//end of display()
   void insert()//inserting an element in to an array
{
   cout<<"\nEnter the position for the new element:\t";
   cin>>pos;
```

```
    cout<<"\nEnter the element to be inserted :\t";
    cin>>val;
    for (i=n; i>=pos-1; i--)
{
    a[i+1]=a[i];
}
a[pos-1]=val;
      n=n+1;
display();
}//end of insert()
void del()//deleting an array element
{
    cout<<"\n Enter the position of the element to be deleted:\t";
    cin>> pos;
    val= a [pos];
    for (i= pos;i<n-1;i++)
{
    a[i]=a[i+1];
}
    n=n-1;
cout<<"\nThe deleted element is = "<<val;
display();
}//end of delete()
```

Output

```
Enter the size of the array elements:   5
Enter the elements for the array:
1
2
3
4
5
--------Menu-----------
1.Insert
2.Delete
3.Exit
----------------------
```

Enter your choice: 1
Enter the position for the new element: 3
Enter the element to be inserted : 26
The array elements are:
1 2 26 3 4 5
--------Menu----------
1.Insert
2.Delete
3.Exit

Enter your choice: 2
Enter the position of the element to be deleted: 2
The deleted element is = 2
The array elements are:
1 3 26 4 5
--------Menu----------
1.Insert
2.Delete
3.Exit

Enter your choice: 3

CS 7 - Boundary Element of a Matrix

CS-7 Write a C++ program to print boundary elements of a matrix

Coding

```
#include <iostream>
using namespace std;
void printBoundary (int a[][10], int m, int n)
{
for (int i = 0; i < m; i++) {
for (int j = 0; j < n; j++)
{
if (i==0|| j==0||i==m-1||j==n-1)
```

```
cout<<a[i][j]<<" ";
else
cout<<"  ";
}
cout <<endl ;
}
}
// Driver code
int main()
{
   int a[10][10] ,i,j,m,n;
   cout<<"Enter more than 3 number of rows and columns"<<endl;
   cin>>m>>n;
            for (i=0;i<m;i++)
   {
            for (j=0;j<n;j++)
   {
            cout<<"enter the value for array["<<i+1<<"]"<<"["<<j+1<<"] :";
            cin>>a[i][j];
    }
}
system("cls");
   cout<<"\n\nOriginal Array\n";
   for (i=0;i<m;i++)
{
   for (j=0;j<n;j++)
   {
            cout<<a[i][j]<<" ";
    }
   cout<<endl;
}
   cout<<"\n\n The Boundry element\n";
   printBoundary(a, m, n);
return 0;
}
```

Output

Enter more than 3 number of rows and columns

4 4

enter the value for array[1][1] :1
enter the value for array[1][2] :2
enter the value for array[1][3] :3
enter the value for array[1][4] :4
enter the value for array[2][1] :5
enter the value for array[2][2] :6
enter the value for array[2][3] :7
enter the value for array[2][4] :8
enter the value for array[3][1] :9
enter the value for array[3][2] :0
enter the value for array[3][3] :1
enter the value for array[3][4] :2
enter the value for array[4][1] :3
enter the value for array[4][2] :4
enter the value for array[4][3] :5
enter the value for array[4][4] :6

Original Array

1 2 3 4
5 6 7 8
9 0 1 2
3 4 5 6

The Boundary element

1 2 3 4
5 8
9 2
3 4 5 6

CS8 - ABC PUBLISHERS

CS-8 Define a class named Publisher in C++ with the following descriptions

private members

Bookno integer
Title 20 characters

Author 10 characters

price float

Totamt float

Define a member function called calculate() to calculate the number of copies and the price and return the total amount.

Public members

- A default constructor function to initialize all data members.The book number must be automatically generated staring from 1001
- Readdata() function to accept values for Title,Author and price.Get the number of copies from the user and invoke calculate().
- Display data () function display all the data members in the following format

```
                    ABC PUBLISHERS
                    ~~~~~~~~~~~~~~~~~~
                        INVOICE
                        ~~~~~~~~~
==================================
Book Number         :
Title           :
Author Name         :
Price Per Book:
Total Amount        :
==================================
```

Coding

```
#include<iostream>
#include<stdlib.h>
using namespace std;
int id=1001;
class Publisher
{
int Bookno;
char Title[20];
char Author [10];
float Price;
float Totamt;
float calculate (int);
public:
Publisher()
```

```
{Bookno=id;
Title[0]='\0';
Author[0]='\0';
     Price=0;
Totamt=0;
id++;
}
void Readdata();
void Displaydata();
};
void Publisher::Readdata()
{
int nocopies;
cout<<"Enter the Title name ";cin>>Title;
cout<<"Enter the Author name ";cin>>Author;
cout<<"Enter the Price ";cin>>Price;
cout<<"Enter the Number of copies ";cin>>nocopies;
Totamt=calculate(nocopies);
}
float Publisher::calculate(int x)
{
   return x*Price;
}
void Publisher::Displaydata()
{
cout<<"\n\t\tABC PUBLISHERS\n";
cout<<"\t\t~~~~~~~~~~~~~~~\n";
cout<<"\t\t  INVOICE\n";
cout<<"\t\t  ~~~~~~~\n";
cout<<"\n==================================\n";
cout<<" Book Number : "<<Bookno<<endl;
cout<<"Title                    : "<<Title<<endl;
cout<<"Author Name   : "<<Author<<endl;
cout<<"Price Per Book : "<<Price<<endl;
cout<<"Total Amount  : "<<Totamt<<endl;
cout<<"\n==================================\n";
```

```
}
int main()
{
   int n,i;
   Publisher p[10];
   cout<<"Enter the number of object to be created";cin>>n;
   for (i=0;i<n;i++)
   p[i].Readdata();
   for (i=0;i<n;i++)
   p[i].Displaydata();
   return 0;
}
```

Output

```
Enter the number of object to be created2
Enter the Title name C++Programming
Enter the Author name Balaguru
Enter the Price 500
Enter the Number of copies 3
Enter the Title name CoreJava
Enter the Author name Xavier
Enter the Price 250
Enter the Number of copies 5
                                    ABC PUBLISHERS
                                    ~~~~~~~~~~~~~~
                                        INVOICE
                                        ~~~~~~~
==================================
Book Number    : 1001
Title                  : C++Programming
Author Name            : Balaguru
Price Per Book  : 500
Total Amount    : 1500
==================================
          ABC PUBLISHERS
          ~~~~~~~~~~~~~~
          INVOICE
```

~~~~~~~

==========

Book Number : 1002

Title : CoreJava

Author Name : Xavier

Price Per Book : 250

Total Amount : 1250

==========

CS9 - EMPLOYEE DETAILS USING CLASS

CS-9 **Create a C++ program to create a class employee containg the following members in public.**

Public members

eno integer

name 20 characters

des 20 characters

member Function

void get() to accept values for all data members

Declare the derived class called Salary which contain the following details.

Public members

bp, hra, da, pf, np float

member Function

void get1() to accept values for bp,hra,da and pf and invoke calculate()

calculate() calculate the np by adding bp,hra,da subtracting pf

display() Display all the details

Create the derived class object and read the number of employees.Call the function get(),get1() for each employee and display the details

Coding

```
#include<iostream>
using namespace std;
class emp{
public:
int eno;
char name[20], des[20];
void get(){
```
~~~~~~~

```
cout<<"Enter the employee number:";
cin>>eno;
cout<<"Enter the employee name:";
cin>>name;
cout<<"Enter the designation:";
cin>>des;
}
};
class salary :public emp
{
float bp,hra, da,pf,np;
public:
void get1()
{
cout<<"Enter the basic pay:";
cin>>bp;
cout<<"Enter the HouseRent Allowance:";
cin>>hra;
cout<<"Enter the Dearness Allowance :";
cin>>da;
cout<<"Enter the Provident Fund:";
cin>>pf;
}
void calculate()
{
np=bp+hra+ da -pf;
}
void display()
   {
cout<<eno<<"\t"<<name<<"\t"<<des<<"\t"<<bp<<"\t"<<hra<<"\t"<<da<<"\t"<<pf<<"\
t"<<np<<"\n";
}
};
int main(){
int i, n;
char ch;
salary s[10];
cout<<"Enter the number of employee:";
cin>>n;
for (i =0; i < n; i++){
```

```
s[i].get();
s[i].get1();
s[i].calculate();
}
   cout<<"\n\t\t\tEmployee Details\n";
   cout<<"\ne_no \t e_name\t des \t bp \t hra \t da \t pf \t np \n";
   for (i =0; i < n; i++){
   s[i].display();
}
return 0;
}
```

Output

```
Enter the number of employee:2
Enter the employee number:1201
Enter the employee name:Ramkumar
Enter the designation:Engineer
Enter the basic pay:50000
Enter the House Rent Allowance:10000
Enter the Dearness Allowance :5000
Enter the Provident Fund:1000
Enter the employee number:1202
Enter the employee name:Viswanathan
Enter the designation:Engineer-Tech
Enter the basic pay:40000
Enter the House Rent Allowance:9000
Enter the Dearness Allowance :4500
Enter the Provident  Fund:1000
                    Employee Details
e_noe_name                  des                 bp      hra         da      pf      np
1201    Ramkumar    Engineer        50000   10000       5000    1000    64000
1202    Viswanathan Engineer-Tech       40000   9000        4500    1000    52500
```

CS10 -STUDENT DETAILS

CS-10 **Write a C++ program to create a class called Student with the following details**

Protected member

Rno integer

Public members

void Readno(int); to accept roll number and assign to Rno
void Writeno(); To display Rno.
The class Test is derived Publically from the Student class contains the following details
Protected member
Mark1 float
Mark2 float
Public members
void Readmark(float,float); To accept mark1 and mark2
void Writemark(); To display the marks
Create a class called Sports with the following detail
Protected members
score integer
Public members
void Readscore(int); To accept the score
void Writescore(); To display the score
The class Result is derived Publically from Test and Sports class contains the following details
Private member
Total float
Public member
void display() assign the sum of mark1 ,mark2,score in total.
invokeWriteno(),Writemark() and Writescore() .Display the total also.

Coding

```
#include<iostream>
using namespace std;
class Student
{
   protected:
   int Rno;
   public:
   void Readno(int r)
   {
   Rno=r;
   }
   void Writeno()
   {
            cout<<"\nRoll no : "<<Rno;
   }
};
class Test :public Student
```

```
{
   protected:
   float Mark1,Mark2;
   public:
   void Readmark (float m1,float m2)
   {
            Mark1=m1;
            Mark2=m2;
   }
void Writemark()
{
cout<<"\n\n\tMarks Obtained\n ";
cout<<"\n Mark1       : "<<Mark1;
cout<<"\n Mark2       : "<<Mark2;
}
};
class Sports
{
protected:
int score;// score = Sports mark
public:
void  Readscore (int s)
{
score=s;
}
void  Writescore()
   {
cout<<"\n Sports Score : "<<score;
   }
};
class Result :public Test,public Sports
{
int Total;
public:
void display()
{
   Total = Mark1 + Mark2 + score;
Writeno();
Writemark();
Writescore();
```

```
cout<<"\n\n Total Marks Obtained    : "<< Total<<endl;
}
};
int main()
{
   Result stud1;
stud1.Readno(1201);
stud1.Readmark(93.5,95);
stud1.Readscore(80);
cout<<"\n\t\t\t HYBRID INHERITANCE PROGRAM\n";
stud1.display();
return 0;
}
```

Output

```
HYBRID INHERITANCE PROGRAM
Roll no : 1201
      Marks Obtained
 Mark1            : 93.5
 Mark2            : 95
 Sports Score     : 80
 Total Marks Obtained    : 268
```

COMPUTER SCIENCE – XI
List of Authors and Reviewers

Domain Experts

Dr. T.V.Gopal
Professor ,Dept. of Computer Science and Technology,
College of Engineering, Guindy, Anna University, Chennai.

Dr. Chitra Babu
Professor and Head of the Department,
Dept of Computer Science and Engineering, SSN College of Engineering , Chenna

Mrs. Bagyalakshmi P
Asst. Professor and Head of the Department, Dept of Computer Applications, Queen Mary's College, Chennai

Mrs. Sasikala k
Associate Professor, Dept of Computer Science,
Queen Mary's College, Chennai

Dr. Radha P
Assistant Professor, Dept of Information Technology,
Govt. Arts & Science College (A), Coimbatore

Dr. Nester Jeyakumar M
Associate Professor and Head Of the Department,
Dept of Computer Science, Loyola College, Chennai

Dr. Srinivasan N
Professor, Dept of Computer Science and Engineering,
Sathyabama Institute of Science & Technology, Chennai

Dr. Chandra Mohan B
Associate Professor, School of Computer Science and Engineering,
Vellore Institute of Technology, Vellore

Mr. Sethuraman R
Assistant Professor, Dept of Computer Science and Engineering,
Sathyabama Institute of Science & Technology, Chennai

Mr. Sankar K
Assistant Professor, Dept of Computer Science,
RKM Vivekananda College, Mylapore, Chennai

Experts Co-ordinator

Mr. Ravikumar Arumugam
Deputy Director,
SCERT, Chennai

Art and Design Team

Layout
THY designers and computers
Chennai.

In-House
Gopu Rasuvel
Rajesh Thangapan
C. Prasanth
Adaikkala Stephen S

Cover Design
Kathir Arumugam

Co-ordination
Ramesh Munisamy

Reviewers

Dr. Ranjani Parthasarathi
Professor, Dept of Info Sci and Tech, College of Engineering, Guindy, Anna University, Chennai

Mr. Munivel E
Scientist/Engineer 'C' IT Group (Information Security), NIELIT
Calicut (MeitY, Govt. of India), NIT Campus, Calicut - KL (IN).

Authors

Mr. Kannan K
Post Graduate Teacher, Chennai Girls Hr Sec School,
Rotler street , Chennai

Mr. Ramakrishnan V G
Post Graduate Teacher, Karnataka Sangha Hr Sec School,
T Nagar, Chennai

Mrs. Bindhu Mohandas
Post Graduate Teacher, Vijayanta Model Hr Sec School,
H.V.F Estate , Avadi, Chennai

Mr. Gowrisankar N.V
Post Graduate Teacher, Chennai Girls Hr Sec School,
Nungambakkam, Chennai

Mr. Sreenivasan R
Post Graduate Teacher, Santhome Hr Sec School, Mylapore, Chennai

Mr. Lenin K
Post Graduate Teacher, Chennai Girls Hr Sec School, Saidapet, Chennai

Miss. Sangeetha A
Post Graduate Teacher, Govt. Hr Sec School, Rajanthangal,
Thiruvannamalai Dt

Dr. Valarmathi K E
Post Graduate Teacher, Velammal Vidhyashram, Surapet, Chennai

Mrs. Gajalakshmi R
Post Graduate Teacher, Jaigopal Garodia Hindu Vidyalaya Hr Sec School,
West Mambalam, Chennai

Dr.Mrs. Vidhya H.
Post Graduate Teacher,
DAV Boys Senior Secodnary School, Gopalapuram, Chennai.

Academic Coordinators

Mrs. Nevedha Selvaraj
Assistant Professor, SCERT, Chennai

Mrs. Tamil Selvi R
B.T. Assistant,
Government High School, Poonampalayam, Trichy District

QR Code Management Team

R. Jaganathan, SGT,
PUMS - Ganesapuram, Polur,
Thiruvannamalai.

S. Albert Valavan Babu, B.T. Asst,
GHS, Perumal Kovil, Paramakudi,
Ramanathapuram

M. Murugesan, B.T. Asst.,
PUMS., Pethavelankottagam,
Muttupettai, Thiruvarur.

This book has been printed on 80 G.S.M.
Elegant Maplitho paper.

Printed by offset at: