

## The Spoken Tutorial Project

- Self-explanatory: uses simple language
- Audio-video: uses multisensory approach
- Small duration: has better retention
- Learner-centered: learn at your own pace
- Learning by doing: learn and practise simultaneously
- Empowerment: learn a new FLOSS (Free/Libre and Open Source Software)

## Target Group

- Students- High School and College
- Working professional- Software users, developers and trainers
- Research scholars
- Community at large

## Workshops

The Spoken Tutorial Project Team conducts workshops on Java and other FLOSS using spoken tutorials and gives certificates to those who pass an online test.

For more details, please visit <https://spoken-tutorial.org>

## Forum

We have developed a beginner friendly Forum to answer specific questions pertaining to any part of a particular tutorial.

For more details, please visit <https://forums.spoken-tutorial.org>.

The Spoken Tutorial Project is funded by the National Mission on Education through Information and Communication Technology, Ministry of Human Resource Development, Government of India.

## Contact us

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Website: <https://spoken-tutorial.org>

Forum help available to all learners

Content available in 22 Indian languages



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Handwritten signatures and stamps, including a circular stamp with the text 'PRINCIPAL, IIT Bombay' and 'Digitized by eGangotri'.

## Introduction

- Java is the most popular class-based, object-oriented, high-level programming language.
- Developed by James Gosling at Sun Microsystems and released in 1995 as a core component of Sun Microsystems' Java platform.
- Derives much of its syntax from C and C++.
- Is typically compiled to bytecode (class file). It can be run on any Java Virtual Machine (JVM) regardless of the architecture.
- Is specifically designed to have few implementation dependencies.
- Is intended to let application developers write a code that runs on one platform & does not need to be recompiled to run on another.

## Java has characteristics of Object-Oriented languages

- **Inheritance:** Creating new classes & extending them to reuse the existing code and adding new features as needed.
- **Encapsulation:** combining the information and providing the abstraction.

- **Polymorphism:** Providing different functionality by the functions having the same name, based on the signatures of the methods.

- **Dynamic binding:** Providing maximum functionality to a program about the specific type at runtime.

## Features

### Platform independence:

Key feature of Java language is write-once-run-anywhere (WORA) concept. With Java, you can run the code written on any system.

### Simplicity:

Programs are easy to write and debug. Java provides a bug-free system due to strong memory management.

**Portability:** Java feature write-once-run-anywhere makes it portable, provided that the system has an interpreter for JVM.

Also, Java has standard data size irrespective of the OS or the processor.

**Performance:** Uses native code and lightweight process called threads.

The advance version of JVM uses adaptive and just-in-time compilation technique to improve the total performance.

**Distributed:** Widely used protocols like HTTP and FTP are developed in Java. Internet programmers can call functions on these protocols and can access the files from

any remote machine on the internet, rather than writing codes on their local system.

### Secure:

- Programs in Java run under an area known as the sandbox.
- Security manager determines the accessibility options of a class like reading and writing a file to the local disk.
- Uses public key encryption system to allow the java applications to transmit over the internet, in a secure and encrypted form.

- The bytecode verifier checks the classes after loading.

### Robust:

- Java has
  - Strong memory allocation.
  - Automatic garbage collection mechanism.
  - Powerful exception handling.
  - Type-checking mechanism.

- A compiler that checks the program for any errors and interpreter checks any runtime errors and makes the system secure from crashes.

A. [Signature]  
[Stamp: Jyoti Institute of Technology, Jyoti Institute of Technology (W), C. P. Road, Jyoti Institute of Technology]



# Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)  
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

## Department of Information Technology

### JAVA

#### Course Outcomes:

#### At the end of the course the student should be able to:

1. Understand OOP concepts to apply basic Java constructs
2. Analyze different forms of inheritance and handle different kinds of file I/O
3. Evaluate the usage of Exception Handling and Multithreading in complex Java programs
4. Contrast different GUI layouts and design GUI applications
5. Construct a full-fledged Java GUI application, and Applet with database connectivity

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## 1 Online / Offline content

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4. The Spoken Tutorial content will be downloaded as a zip file on your machine.
5. Extract the contents of the zip file & access them.

## 2 The procedure to practise

1. You have been given a set of spoken tutorials and files.
2. You will typically do one tutorial at a time.
3. You may listen to a spoken tutorial and reproduce all the commands shown in the video.
4. If you find it difficult to do the above, you may consider listening to the whole tutorial once and then practise during the second hearing.

## 3 Java

1. Click on "Select FOSS" or "All FOSS Categories" drop-down and choose "Java".
2. Click on "Select Language" or "All Languages" drop-down and choose the language (English, Hindi, Marathi ...) in which you wish to learn.
3. Click on "Submit" button.
4. You will see a list of tutorials based on your selection.
5. Start with the first tutorial in the displayed list.

## 4 First tutorial: Getting started with Java Installation

1. Locate the topic "Getting started with Java Installation" and click on it.

2. To view the tutorial, click on the Play icon which is located in the player.
3. The Pre-requisite will be visible below the player (only for Online contents).
4. Outline, Assignments, Code Files and Slides are available below the player.
5. Adjust the size of the browser in such a way that you are able to practice in parallel.
6. At 2:56 mins, pause the video.

### 4.1 Open Terminal on Linux OS

- (a) The video says that you need to use the "Terminal" and "gedit text editor" in Linux OS.
- (b) The tutorials are explained on the Linux OS.
- (c) It will be easy for Linux users to follow as instructed in the tutorial.

### 4.2 Open Command Prompt on Windows OS

- (a) On Windows, one has to use "Command prompt" and "Notepad++ text editor" instead of "Terminal" and "gedit text editor".
- (b) To open the "Command Prompt" on Windows, press the "Windows" key and "R" key simultaneously on your keyboard. It will open the "Run" prompt.
- (c) At the prompt, type "cmd" and click on "Ok".
- (d) This will open the "Command" prompt.
- (e) Notepad++ can be opened from  
Start >> Applications >> Notepad++.

7. Play-pause-practise the whole tutorial.
8. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player
9. Follow all the above instructions, till you complete the first 2 tutorials.
10. Third tutorial, Installing Eclipse will teach how to install Eclipse on Linux.
11. For Eclipse - Windows Installation procedure, refer the Java - Installation Sheet.

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## 5 Fourth tutorial : Getting started Eclipse

1. From here onwards, the remaining tutorials are explained using the Eclipse IDE.
2. The commands shown, will work on both Linux OS and Windows OS.
3. Follow all the instructions given in the individual tutorials and reproduce all the commands as shown.

### 5.1 Instructions to practise

- (a) Create a folder on the "Desktop" with your "Name-RollNo-Component". (Eg. "prathamesh-04-java").
- (b) Give a unique name to the files you save, so as to recognize it next time. (Eg. "Practice-1-java").
- (c) Remember to save all your work in your folder.
- (d) This will ensure that your files don't get over-written by someone else.
- (e) Save your work from time to time, instead of saving it at the end of the task.

### 5.2 Common instructions for Assignments

- (a) Attempt the Assignments as instructed in the tutorial.
- (b) Save your work in your folder.

### 5.3 Common instructions to use Code files

- (a) Click on the link "Code files" located below the player and save it in your folder.
  - (b) Extract the downloaded zip file.
  - (c) You will see all the code/source files used in the particular tutorial.
  - (d) Use these files as per the instructions given in the particular tutorial.
4. Play-pause-practise the whole tutorial.
  5. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.
  6. Follow all the above instructions, till you complete all the tutorials in the series.

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### Introduction

PHP or "PHP : Hypertext Preprocessor" is a widely-used Open Source general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. Its syntax draws upon C, Java and PERL, and is easy to learn.

The main goal of the language is to allow web developers to write dynamically generated web pages quickly, but you can do much more with PHP.

### Uses of PHP •

- To create large websites
  - For E-commerce like osCommerce, OpenCart
  - To create online discussion forums like phpBB
  - To create content management systems like Drupal, Joomla
  - To create e-learning management systems like Moodle
  - To develop web-based management tools like phpMyAdmin
- And many more..

### Introduction

MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. The SQL phrase stands for Structured Query Language. Applications which use MySQL data bases include: Joomla, Word Press, MyBB, phpBB, Drupal and other software built on the LAMP software stack.

A third party open source software "phpMyAdmin" is used as a web-based front end for managing MySQL databases easily and efficiently. It is widely installed by Web hosts worldwide. Also it is included in the convenient LAMP, MAMP and WAMP software bundle installers.

MySQL is used in many high-profile, largescale World Wide Web products, including Wiki-pedia, Google and facebook.

### Features of PHP & MySQL

- Scalability and flexibility
  - High speed and high performance
  - Data protection
  - Comprehensive Application Development
  - Management tools
- And many more...

### Benefits

- A large chunk of facebook, the world's leading social networking site, has a huge code based in PHP and it uses MySQL as database to store information of 1 billion+ users!
- PHP is the most preferred language for web development by free-lance developers across the globe.
- Many free and open source CMS like Drupal, Moodle, etc. are created using PHP & MySQL.
- PHP & MySQL has a large user and developer community.

### Links:

Original videos are available at  
<http://phpacademy.org>

PHP Official Website - <http://www.php.net>

MySQL Official Website -  
<http://www.mysql.com>

W3Schools - PHP and MySQL Tutorials -  
<http://www.w3schools.com/php/default.asp>  
<http://www.w3schools.com/sql/default.asp>

These tutorials will help you get started with PHP programming. In this series we will go through the basics of installing and getting PHP ready for development, the basic syntax and features of the language.



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## Department of Information Technology

### PHP and MySQL

#### Course Outcomes:

#### At the end of the course the student should be able to:

1. Develop web applications using server side scripting language-PHP
2. Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries in web applications.
3. Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement in web applications.

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1. You have been given a set of spoken tutorials and files.
2. You will typically do one tutorial at a time.
3. You may listen to a spoken tutorial and reproduce all the steps shown in the video.
4. If you find it difficult to do the above, you may consider listening to the *whole* tutorial once and then practise during the second hearing.

## 3 PHP and MySQL

1. Click on "Select FOSS" or "All FOSS Categories" drop-down and choose "PHP and MySQL".
2. Click on "Select Language" or "All Languages" drop-down and choose the language (English, Hindi, Marathi ...) in which you wish to learn.
3. Click on "Submit" button.
4. You will see a list of tutorials based on your selection.
5. In this series, first 2 tutorials will teach you about "How to install PHP & MySQL on Windows & Linux".
6. If you have already installed PHP & MySQL, skip these tutorials.
7. Start with the third tutorial "Echo Function" in the displayed list.

## 4 First tutorial: XAMPP in Windows

1. If you are a Windows User, locate the topic "XAMPP in Windows"
2. To view the tutorial, click on the Play icon which is located in the player.
3. This tutorial will teach how to install XAMPP on Windows OS.
4. Please note: There could be minor changes in the look and feel of newer versions of XAMPP. However, all the commands shown in the video will work in newer versions as well.

## 5 Second tutorial: XAMPP in Linux

1. If you are a Linux User, locate the topic "XAMPP in Linux"
2. To view the tutorial, click on the Play icon which is located in the player.
3. This tutorial will teach how to install XAMPP on Linux OS.
4. Please note: There could be minor changes in the look and feel of newer versions of XAMPP. However, all the commands shown in the video will work in newer versions as well.

## 6 Third tutorial: Echo Function

1. Locate the topic "Echo Function" and click on it.
2. To view the tutorial, click on the Play icon which is located in the player.
3. The Pre-requisite will be visible below the player (only for Online contents).
4. Outline, Assignments, Code Files and Slides are available below the player.
5. Adjust the size of the browser in such a way that you are able to practice in parallel.

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## 6.1 Instructions to practise on Windows OS

- (a) The tutorials are explained on Windows OS.
- (b) It will be easy for the Windows users to follow, as instructed in the tutorial.
- (c) Before you begin to practise, kindly create a folder "phpacademy" inside the folder `c:\xampp\htdocs`
- (d) Create the file `helloworld.php` in the folder `c:\xampp\htdocs\phpacademy` as it is required for this tutorial.
  - i. To do this, open the **ConTEXT** editor.
  - ii. Click on **File >> New >> Save As**.
  - iii. Name the file as `helloworld.php`.
  - iv. Remember to choose the location as `c:\xampp\htdocs\phpacademy`
  - v. Now click on **Save** button.
- (e) Please note that the path of `phpacademy` folder shown in the video is `c:\xampp\htdocs\phpacademy`
- (f) This will be your working directory for all the tutorials.
- (g) Henceforth, for all the videos, the `.php` and/or `.html` files should be created/copied in this directory.
- (h) You are free to create subdirectories here for each tutorial, so that you can manage all your files in a better way.

## 6.2 Instructions to practise on Linux OS

- (a) The tutorials are explained on Windows OS.
- (b) To practise on Linux, follow these steps.
- (c) Before begin your practice, kindly create a folder "phpacademy" inside the folder `/opt/lampp/htdocs/`
- (d) Based on your installation, the web root path may vary as `/opt/lampp/htdocs/` or `/var/www/`.
- (e) Create the file `helloworld.php` in the folder `/opt/lampp/htdocs/phpacademy` as it is required for this tutorial.
- (f) To do this, open the Terminal by pressing **Ctrl-Alt-t** keys simultaneously.
- (g) Now type `cd /opt/lampp/htdocs/phpacademy` in the Terminal and hit ENTER.

- (h) Now type `gedit helloworld.php & and hit ENTER.`
- (i) Please note that the path of `phpacademy` folder shown in the video is `c:\xampp\htdocs\phpacademy`
- (j) This is your working directory in Windows.
- (k) But for Linux OS, the equivalent path is: `/opt/lampp/htdocs/` or `/var/www/`
- (l) This will be your working directory for all the tutorials.
- (m) Henceforth, for all the videos, the `.php` and/or `.html` files should be created/copied in this directory.
- (n) You are free to create subdirectories here for each tutorial, so that you can manage all your files in a better way.

6. Now resume the video and follow all the instructions.
7. Type all the code shown in the video in `helloworld.php` file and save it periodically, by clicking **File >> Save**.
8. At time 1:07 min, the video shows Firefox web browser to view `helloworld.php` file.
9. You can view this file in a separate tab or in a new web browser window.
10. Type `http://localhost/phpacademy/` in the address bar of your Firefox browser.
11. Click `helloworld.php`.
12. This will open `helloworld.php` in the browser.
13. Every time you make some change to `helloworld.php` using `gedit`(Linux) or `ConTEXT`(Windows) editor, you should save your changes and refresh your web browser by pressing the F5 key, to reflect the changes.
14. In some of the future tutorials, Google Chrome is used as the web browser. But you can continue using Firefox or any other web browser.
15. From time 1:55 min, the video talks about **parse error**.
16. Please understand it carefully and try to reproduce the exact code as shown in the video.
17. Remember to save all your work in your folder.
18. This will ensure that your files don't get overwritten by someone else.

*A. K. ...*  
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Kudremukh-75.

### 6.3 Common instructions for Assignments

- (a) Attempt the **Assignments** as instructed in the tutorial.
- (b) Save your work in your folder.

### 6.4 Common instructions to use Code files

- (a) Click on the link "Code files" located below the player and save it in your folder.
- (b) Extract the downloaded zip file.
- (c) You will see all the code/source files used in the particular tutorial.
- (d) Use these files as per the instructions given in the particular tutorial.

19. Play-pause-practise the whole tutorial.

20. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.
21. Follow all the above instructions, till you complete all the tutorials in the **Basic Level**.

### 7 Twenty-fifth tutorial: MySQL Part 1

1. At 07:05 Primary key option is different in the latest version.  
Click the drop down-box below the **Index** label and select "Primary". A new window opens to **Add index**.  
Click on the **Go** button to set the primary key.
2. At 07:08 - Auto-increment can be set by clicking the check box **A.I**.
3. Follow all the above instructions, till you complete all the tutorials in the series.

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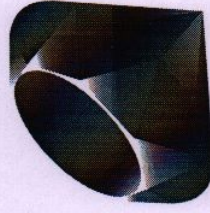


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**Ruby**

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## Introduction

- Ruby is an object-oriented scripting language designed by Yukihiro Matsumoto.
- It is a free and open source language.
- Ruby syntax is much easier to read and write.

## Ruby Installation

Ruby can be installed using the **Ubuntu Software Centre**.

## Other installation methods:

**rvm** (Ruby Version Manager)

<https://rvm.io/rvm/install>

**rbenv**

<http://rubbysource.com/>

**up-and-running-with-rbenv**

```
#!/usr/bin/ruby
#begin
my First Ruby Program
this code will print 'hello world'
puts "hello world"
```

```
#!/usr/bin/ruby
def add(a,b)
return a+b
end
puts "Enter the values of a and b"
a=1
b=2
c=add(a,b)
puts "Sum of two number #(a) and #(b) is #(c)"
```

```
class Product
  attr_reader :name, :price, :description
  def initialize(name, price, description)
    @name = name
    @price = price
    @description = description
  end
  def self.price
    price
  end
end
```

## Features

- Ruby works on Linux, Windows and Mac operating system
- Ruby is very easy to learn
- It is highly portable
- Ruby is a server-side scripting language similar to Python and PERL
- It can be used for developing Internet and intranet applications
- Ruby can be embedded into Hypertext Markup Language (HTML)
- It can be used to write Common Gateway Interface (CGI) scripts
- Ruby can easily be connected to DB2, MySQL, Oracle, and Sybase
- It supports automatic memory management
- RubyGems provides a standard format for distributing Ruby programs and libraries

## Spoken Tutorials in Ruby Series

### Basic Level Tutorials

- Hello Ruby
- Variables in Ruby
- Ruby Methods
- Arithmetic and Relational Operators
- Logical and other Operators
- Control Statements

### Intermediate Level Tutorials

- for and each looping statements
- while and until looping statements
- Object Oriented concept in Ruby
- Object Oriented Programming Methods

```
my_num = -1
if my_num > 0
  puts "The value of my_num is greater than 0"
else
  puts "The value of my_num is lesser than 0"
end
```

```
def add(a,b)
return a+b
end
puts "Enter the values of a and b"
a=1
b=2
c=add(a,b)
puts "Sum of two number #(a) and #(b) is #(c)"
```

*Handwritten notes and signatures in blue ink, including 'A. J. Singh' and 'Practical (VIVA)'.*



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## Department of Information Technology

### RUBY

#### Course Outcomes

At the end of the course the student should be able to:

1. Setup the Ruby development environment and Learn the fundamentals of the Ruby language
2. Learn about the built-in Ruby libraries and APIs and Learn the principals of object-oriented programming (OOP) in Ruby.
3. Scheme for creating and using libraries and packages and Learn how to use external libraries with Ruby Gems

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## 3 Ruby

1. Click on "Select FOSS" or "All FOSS Categories" drop-down and choose "Ruby".
2. Click on "Select Language" or "All Languages" drop-down and choose the language (English, Hindi, Marathi ...) in which you wish to learn.
3. Click on "Submit" button.
4. You will see a list of tutorials based on your selection.
5. Start with the first tutorial in the displayed list.

## 4 First tutorial: Hello Ruby

1. Locate the topic "Hello Ruby" and click on it.
2. To view the tutorial, click on the Play icon which is located in the player.

3. The Pre-requisite will be visible below the player (only for Online contents).
4. Outline, Assignments, Code Files and Slides are available below the player.
5. Adjust the size of the browser in such a way that you are able to practice in parallel.
6. At 2:28 mins, pause the video.

### 4.1 Open Terminal on Linux OS

- (a) Here the video shows how to open the "Terminal" in Linux OS.
- (b) The tutorials are explained on the Linux OS.
- (c) It will be easy for the Linux users to follow as instructed in the tutorial.

### 4.2 Open Terminal on Windows OS

- (a) Currently we are in the process of creating instructions to practise Ruby on Windows OS. It will be updated soon.

### 4.3 Instructions to practise

- (a) At the prompt, type `cd Desktop/` and press "Enter".
- (b) Now type `mkdir name-rollno-ruby` and press "Enter".  
(Eg. `mkdir Vin-1-ruby`)
- (c) This will create a folder with your "name" and "rollno" on the Desktop.
- (d) Type `cd name-rollno-ruby` and press "Enter".  
(Eg. `cd Vin-1-ruby`)
- (e) This will take you to that particular folder.
- (f) Give a unique name to the files you save in your folder, so as to recognize it next time.  
(Eg. "Practice-01-ruby")
- (g) Remember to save all your work in your folder.
- (h) This will ensure that your files don't get over-written by someone else.
- (i) Save your work from time to time, instead of saving it at the end of the task.

#### 4.4 Common instructions for Assignments

- (a) Attempt the Assignments as instructed in the tutorial.
- (b) Save your work in your folder.

#### 4.5 Common instructions to use Code files

- (a) Click on the link "Code files" located below the player and save it in your folder.

- (b) Extract the downloaded zip file.
- (c) You will see all the code/source files used in the particular tutorial.
- (d) Use these files as per the instructions given in the particular tutorial.

7. Play-pause-practise the whole tutorial.
8. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.
9. Follow all the above instructions, till you complete all the tutorials in the series.

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- Audio-video: uses multisensory approach
- Small duration: has better retention
- Learner-centered: learn at your own pace
- Learning by doing: learn and practise simultaneously
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### Target Group

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- Research scholars
- Community at large

### Workshops

The Spoken Tutorial Project Team conducts workshops on C and C++ and other FLOSS using spoken tutorials and gives certificates to those who pass an online test.

For more details, please visit <https://spoken-tutorial.org>

### Forum

We have developed a beginner friendly Forum to answer specific questions pertaining to any part of a particular tutorial.

For more details, please visit <https://forums.spoken-tutorial.org>.

The Spoken Tutorial Project is funded by the

National Mission on Education through Information and Communication Technology, Ministry of Human Resource Development, Government of India.

### Contact us

Email: [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)  
Website: <https://spoken-tutorial.org>



**Spoken Tutorial**

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Scan the QR code to visit Spoken Tutorial website

THE



PROGRAMMING  
LANGUAGE

Forum help available to all learners

Content available in 22 Indian languages



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Funded by MHRD, Government of India.

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## About C

C is a general-purpose programming language, initially developed by Dennis Ritchie between 1969 and 1973 at Bell Labs. Its design provides constructs that map efficiently to typical machine instructions. C is one of the most widely used programming language and there are very few computer architectures for which a C compiler does not exist.

## Features

- C has facilities for structured programming and allows lexical variable scope and recursion.
- All executable code is contained within subroutines, called "functions."
- C program source text is free-format, using the semicolon as a statement terminator and curly braces for grouping blocks of statements.
- Typing is static, but weakly enforced: all data has a type, but implicit conversions can be performed; for instance, characters can be used as integers.
- Complex functionality such as I/O, string manipulation, and mathematical functions are easy to implement with library routines.

## About C++

- C++ is a statically typed, free-form, compiled, general-purpose programming language. It was developed by Bjarne Stroustrup starting in 1979, at Bell Labs.
- It adds object-oriented features such as classes, and other enhancements to the C programming language.

The language began as enhancements to C, first adding classes, then virtual functions, operator overloading, multiple inheritances, templates, and exception handling among other features.

C++ is also one of the most popular programming languages and can be implemented on most hardware and OS platforms.

As an efficient compiler to native code, its application domains include:

- Systems software
- Application software
- Device drivers
- Embedded software
- High-performance server and client applications
- Entertainment software like video games



## Features

- Classes: By using classes, we can create user-defined data types. A class is the collection of a set of data and code. An object is the instance of a class.
- Inheritance: Allows one data type to acquire properties of other data types. This provides the idea of reusability, that means we can add new features to an existing class without

modifying it.

- Data Abstraction and Encapsulation: Encapsulation means hiding data from the data structures. Here, the data is accessible to only the functions that are allowed to access it. Abstraction means representing essential features without including background details.
- Polymorphism: means one interface can be used for multiple implementations, so that object can behave differently for each implementation.
- Dynamic Binding: At runtime, the code matching the object under the current reference will be called.

## C and C++ Advantages

- Powerful and flexible: C/C++ are used for developing operating systems, compilers, parsers, interpreters, word processors, search engines and graphic programs.
- Support: C requires less runtime support
- Portable programming language: A variety of C/C++ program written for one computer system can be compiled and run on another system, with little or no change.
- Modular: Written in routines called functions and classes (C++), programs can be used in other applications or programs.
- Preferred by professional programmers: A variety of C/C++ resources and helpful supports are widely available.
- Standardised: Many standards have been documented, maintained and updated for C and C++ as standard references.

*Alvin*  
The C++ language is a general-purpose programming language developed by Bjarne Stroustrup at Bell Labs in 1979. It is a superset of C, adding object-oriented features like classes and templates. C++ is widely used for system programming, game development, and high-performance applications. It is known for its efficiency and portability.

Instruction Sheet for C and C++  
Spoken Tutorial Team  
IIT Bombay



## 1 Online / Offline content

1. The online content of Spoken Tutorials can be accessed from :  
<https://spoken-tutorial.org/tutorial-search/>
2. You can also download the Spoken Tutorials for offline learning from :  
<https://spoken-tutorial.org/cdcontent/>
3. From this link download the FOSS categories in the language you wish to learn.
4. The Spoken Tutorial content will be downloaded as a zip file on your machine.
5. Extract the contents of the zip file & access them.

## 2 The procedure to practise

1. You have been given a set of spoken tutorials and files.
2. You will typically do one tutorial at a time.
3. You may listen to a spoken tutorial and reproduce all the commands shown in the video, as explained in the "Side-by-Side learning" video.
4. If you find it difficult to do the above, you may consider listening to the whole tutorial once and then practise during the second hearing.

## 3 C and C++

1. Click on "Select FOSS" or "All FOSS Categories" drop-down and choose "C-and-CPP".
2. Click on "Select Language" or "All Languages" drop-down and choose the language (English, Hindi, Marathi ...) in which you wish to learn.
3. Click on "Submit" button.
4. You will see a list of tutorials based on your selection.
5. Start with the first tutorial in the displayed list.

## 4 First tutorial: First C Program

1. Locate the topic "First C Program" and click on it.
2. To view the tutorial, click on the Play icon which is located in the player.
3. The **Pre-requisite** will be visible below the player (only for Online contents).
4. **Outline, Assignments, Code Files and Slides** are available below the player.
5. Adjust the size of the browser in such a way that you are able to practise in parallel.

### 4.1 Instructions to practise on Linux OS

#### I) How to learn from the tutorials

- (a) The tutorials are explained on the Linux OS.
- (b) It will be easy for Linux users to follow, as instructed in the tutorial.

#### II) Gedit Text Editor

- (a) The commands are typed in gedit Text Editor on the Linux OS.
- (b) The version of gedit that you are using will be different from the version used in the tutorials. Hence, it is expected to see some differences between the tutorial and the actual gedit interface that you will be using.

### 4.2 Instructions to practise on Windows OS

#### I) How to use Command Prompt

- (a) At 0:55 mins, pause the video.
- (b) Here the video shows how to open the "Terminal" in Linux OS.
- (c) On Windows, one has to use "Command Prompt".
- (d) To open the "Command Prompt" on Windows, press the "Windows" key and "R" key simultaneously on your keyboard. It will open the "Run" prompt.

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- (e) At the prompt, type "cmd" and click on "Ok".
- (f) This will open the "Command Prompt".
- (g) Now resume the video.

## II) How to use Notepad++

- (a) At 1:10, pause the video.
- (b) Here the video shows how to open "gedit" text editor in Linux OS.
- (c) On Windows, one has to use "Notepad++" text editor.
- (d) Notepad++ can be opened from **Start >> Applications >> Notepad++**.
- (e) Type the program code as shown in the tutorial in "Notepad++" text editor.
- (f) Now resume the video.

## III) How to compile and execute

- (a) At 6:50, pause the video.
- (b) Here the video shows how to execute the program in Linux OS.
- (c) To run the program after compilation in Windows OS, type myoutput.exe instead of ./myoutput

## 4.3 Common instructions for Assignments

- (a) At the prompt, type `cd Desktop/` and press "Enter".
- (b) Now type `mkdir name-rollno-c-cpp` and press "Enter".  
(Eg. `mkdir Ashwini-1-c-cpp`)
- (c) This will create a folder with your "name" and "rollno" on the Desktop.
- (d) Type `cd name-rollno-C++` and press "Enter".  
(Eg. `cd Ashwini-1-c-cpp`)
- (e) This will take you to that particular folder.
- (f) Give a unique name to the files you save in your folder, so as to recognize it next time.  
(Eg. "Practice-01-c")
- (g) Remember to save all your work in your directory.
- (h) This will ensure that your files don't get over-written by someone else.
- (i) Remember to save your work from time to time, instead of saving it at the end of the task.

- (j) Attempt the Assignments as instructed in the tutorial.
- (k) Save your work in your folder.

## 4.4 Common instructions to use Code files

- (a) Click on the link "Code files" located below the player and save it in your folder.
  - (b) Extract the downloaded zip file.
  - (c) You will see all the code/source files used in the particular tutorial.
  - (d) Remember to change the path to this directory after opening the terminal.
  - (e) Then use these files as per the instructions given in the particular tutorial.
6. Play-pause-practise the whole tutorial.
  7. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.
  8. Follow all the above instructions, till you complete all the tutorials in the series.

## 5 Eighth tutorial: Increment and Decrement Operators

1. At 7:57 `printf` statement shows `printf("Value of c is %f/n", c)`
2. It should be read & typed as `printf("Value of c is %.2f/n", c)`
3. This is shown at time 8:15

## 6 Twelfth tutorial: Loops

1. At 9:33, A code is executed which goes into an infinite loop.
2. To terminate the loop, press `Ctrl + C` keys simultaneously on the keyboard.

## 7 Twentieth tutorial: File handling in C

1. At 2:20 & 4:19, the path to store `sample.txt` file is mentioned.
2. If typed as given, this path will give you an error on your machine.
3. Instead of the path shown in the video, choose the path as per the directories in your system.

## The Spoken Tutorial project

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The Spoken Tutorial Project

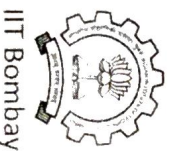
is funded by the

National Mission on Education  
through Information and  
Communication Technology,  
Ministry of Human Resource  
Development,  
Government of India

### Contact us

Email: [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)

Website: <http://spoken-tutorial.org>



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**SPOKEN TUTORIALS**



Linux



+

Ubuntu

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[www.sakshat.ac.in](http://www.sakshat.ac.in)

<http://spoken-tutorial.org>

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What makes Linux endearing to users? Linux consists of the kernel, libraries, and various applications. Each distribution of Linux is a different combination of these elements. And Ubuntu has found the favour of several users making it the most popular.

### What is Ubuntu Linux?

Ubuntu is an ancient African word meaning 'humanity to others'. It also means 'I am what I am because of who we all are'. The Ubuntu Linux operating system brings the spirit of Ubuntu to the world of computers.

Ubuntu is one of the latest and most widely downloaded distributions of Linux. It is the most popular flavor of Linux.

### So, what are the benefits of Linux and Ubuntu?

1. Freeware software: One of the greatest advantages of Linux OS is that it is free of cost; it does not include any paid subscriptions, paid premium editions, or extra paid software. There is very little maintenance cost and it is easy to run and maintain. Further, if you just want to check out the Linux OS, you have the option to boot from a CD, without installation, and try out the Linux experience.

2. Manageability: Linux is easy to manage, starting right from its installation, startup, shutdown, initialization, and package management. It is simple to deploy and you can complete a typical installation of the standard services within 15 minutes. Also, it does not include any additional extraneous applications, making it fast and efficient.

3. Easy to upgrade and update: The Linux OS

is easy to install and upgrade to obtain the latest features. Also, the process of obtaining updates is eased through the Debian and APT packaging, which makes the introduction of new software easy and smooth.

4. Security: Linux is hard-to-hack. To add to that, the frequent updates ensure that any further security risks are also eliminated.

5. Vast source of online help: There are little chances of getting stuck while installing or working with Linux. This is because of a large source of online help available for any issue related to Linux.

6. User-friendly: Ubuntu is user-friendly and easily available. It can also be easily installed. Ubuntu is one OS, currently being considered as the best bet for those struggling and considering moving away from Windows OS. Ubuntu is a clear indication that users are beginning to accept Linux as a better OS. Whether it is for personal use, for your organization or for propagating computer education among your community, Linux is the ideal choice. Its secure environment, user-friendliness and above all its ease of installation, makes it the most favoured OS among most users.

7. Add-ons: Linux is free and requires no costly add-ons. Download Linux from the Internet and install it on as many machines as you want. The same is true of most Linux application software.

### So, why Linux?

Support

Ubuntu & Linux are the best supported operating systems of all time. You can get help from tens of

thousands of active Linux users and programmers from all over the world, at any time.

Multi-platform

Windows is limited to Intel and Intel-compatible processors and only certain machine architectures. Linux and other Unix-compatible operating systems work on a wide variety of processors and machine architectures.

Open Protocols

Linux uses open protocols. There are no proprietary protocols that lock you. Monopolies do not exist in the Linux world.

### With Linux, you can

- Browse the internet with Mozilla Firefox browser – easier, safer and faster, less susceptible to virus infections.
- Do office activities with LibreOffice Suite – a complete suite for document creation, spreadsheet, presentation, design and database. It supports all formats including MS-Word, MS-Excel, MS-Powerpoint.
- Program using Java, Python, C/C++, Shell-script, PHP & MySQL and many more.
- Create graphic designs using GIMP, Inkscape – for photo retouching, image composition and image authoring (equivalent to Photoshop).
- Use multimedia players like VLC, Movie Player for music and videos.

Do all of these & more without purchasing expensive commercial software. Use the Ubuntu Software Centre facility to download any software.

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# Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTU  
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075)

## Department of Information Technology

### LINUX

#### Course Outcomes:

After completing this course the student must able to

1. Understand and make effective use of Linux utilities.
2. Able to write shell scripts to solve the problems.
3. Develop the skills necessary for file system and directory handling.
4. Learn the concepts of process and signal system calls.
5. Implement inter process communication mechanisms.

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3. You may listen to a spoken tutorial and practise by reproducing all the steps shown in the side-by-side video.
4. If you find it difficult to do the above, you may consider listening to the whole tutorial once and then practise during the second hearing.

## 3 Linux

1. Click on "Select FOSS" or "All FOSS Categories" drop-down and choose "Linux".
2. Click on "Select Language" or "All Languages" drop-down and choose the language (English, Hindi, Marathi ...) in which you wish to learn.
3. Click on "Submit" button.
4. You will see a list of tutorials based on your selection.
5. Start with the first tutorial in the displayed list.

## 4 First tutorial: Ubuntu Desktop 16.04

1. Locate the topic "Ubuntu Desktop 16.04" and click on it.

2. To view the tutorial, click on the Play icon which is located in the player.
3. The Pre-requisite will be visible below the player (only for Online contents).
4. Outline, Assignments and Code Files are available below the player.
5. Adjust the size of the browser in such a way that you are able to practice in parallel.
6. This tutorial is created on Ubuntu Linux version 16.04.
7. You will notice some difference in the interface, in later versions of Ubuntu.
8. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.

## 5 Second Tutorial: Desktop Customization 16.04

1. Locate the topic "Desktop Customization 16.04" and click on it.
2. To view the tutorial, click on the Play icon which is located in the player.
3. This tutorial explains how to customise the Desktop of "Ubuntu Linux 16.04".
4. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.

## 6 Third Tutorial: Installing Software 16.04

1. Locate the topic "Installing Software 16.04" and click on it.
2. To view the tutorial, click on the Play icon which is located in the player.
3. "Installing Software 16.04" tutorial explains how to install various software on "Ubuntu Linux 16.04".
4. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.



## 7 Instructions to practise the remaining tutorials

1. The remaining tutorials are explained using the **Linux Terminal**.
2. The commands shown will work on all versions of **Ubuntu Linux**.
3. To open the "**Terminal**", press the "**CTRL, Alt and T**" keys simultaneously on the keyboard.
4. Follow all the instructions given in the individual tutorials and reproduce all the commands as shown.

### 7.1 Common instructions for Assignments

- (a) Attempt the **Assignments** as instructed in each tutorial.
- (b) Save your work in your folder.

### 7.2 Common instructions to use Code files

- (a) Click on the link "**Code files**" located below the player and save it in your folder.
  - (b) Extract the downloaded zip file.
  - (c) You will see all the code/source files used in that particular tutorial.
  - (d) Use these files as per the instructions given in the particular tutorial.
5. Play-pause-practise the whole tutorial.
  6. Once the tutorial is complete, choose the next tutorial from the playlist which is located on the right side or below the player.
  7. Follow all the above instructions, till you complete all the tutorials in the series.

## 8 Seventh Tutorial: Working with Regular Files

1. At 1:49, the video tells to open a file named "**test1.sh**"

2. Pause the tutorial and click on the "**Code Files**" link.
3. Download, unzip and extract the content from the downloaded zip file into a new directory.
4. Go to that new directory.
5. Use the file named "**test1.sh**" and resume the video.
6. Else you will encounter an error "**No such file or directory**".
7. At 2:52 and 3:31, the video shows a path.
8. In your machine, the path will be **/home/your-username**

## 9 Eighth Tutorial: File Attributes

1. At 2:18 and 11:03, the video shows how to change **owner** and **group**.
2. Skip this because you may not have other **users** or **groups** in your machine.

## 10 Ninth Tutorial: Redirection Pipes

1. At 4:12, the video tells to open a file named "**test1.sh**"
2. Pause the tutorial and click on the "**Code Files**" link.
3. Download, unzip and extract the content from the downloaded zip file into a new directory.
4. Go to that new directory.
5. Use the file named "**test1.sh**" and resume the video.
6. Else you will encounter an error "**No such file or directory**".

## 11 Twelfth Tutorial: Basics of System Administration

1. At 11:15, the video tells to type **cd /home**
2. You have to type **cd /home/your-username**

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