9

TOUCHPAD®

Computer Applications

Teacher's Manual

Extended Support for Teachers

ORANGE®
www.orangeeducation.in
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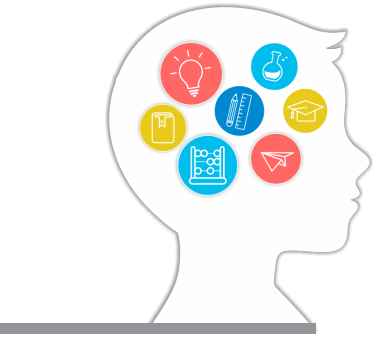
Teacher's Time Table

Periods / Days	0	I	II	III	IV	BREAK	V	VI	VII	VIII
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										



Development Milestones in a Child

Development milestones are a set of functional skills or age-specific tasks that most children can do at a certain age. These milestones help the teacher to identify and understand how children differ in different age groups.

Age 5 - 8 Years	
Physical	• First permanent tooth erupts • Shows mature throwing and catching patterns • Writing is now smaller and more readable • Drawings are now more detailed, organised and have a sense of depth
Cognitive	• Attention continues to improve, becomes more selective and adaptable • Recall, scripted memory, and auto-biographical memory improves • Counts on and counts down, engaging in simple addition and subtraction • Thoughts are now more logical
Language	• Vocabulary reaches about 10,000 words • Vocabulary increases rapidly throughout middle childhood
Emotional/Social	• Ability to predict and interpret emotional reactions of others enhances • Relies more on language to express empathy • Self-conscious emotions of pride and guilt are governed by personal responsibility • Attends to facial and situational cues in interpreting another's feelings • Peer interaction is now more prosocial, and physical aggression declines

"If you cannot do great things, do small things in a great way."

Age 9 - 11 Years	
Physical	• Motor skills develop resulting enhanced reflexes
Cognitive	• Applies several memory strategies at once • Cognitive self-regulation is now improved
Language	• Ability to use complex grammatical constructions enhances • Conversational strategies are now more refined
Emotional/Social	• Self-esteem tends to rise • Peer groups emerge

Age 11 - 20 Years	
Physical	• If a girl, reaches peak of growth spurt • If a girl, motor performance gradually increases and then levels off • If a boy, reaches peak and then completes growth spurt • If a boy, motor performance increases dramatically
Cognitive	• Is now more self-conscious and self-focused • Becomes a better everyday planner and decision maker
Emotional/Social	• May show increased gender stereotyping of attitudes and behaviour • May have a conventional moral orientation

Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

"Family is the most important thing in the world."

Teaching Pedagogies

Pedagogy is often described as the approach to teaching. It is the study of teaching methods including the aims of education and the ways in which such goals can be achieved.

Lesson Plans

A lesson plan is the instructor's road map which specifies what students needs to learn and how it can be done effectively during the class time. A lesson plan helps teachers in the classroom by providing a detailed outline to follow in each class.

A lesson plan addresses and integrates three key components:

- Learning objectives
- Learning activities
- Assessment to check the student's understanding

A lesson plan provides an outline of the teaching goals:

Before the class:

1. Identify the learning objectives.
2. Plan the lesson in an engaging and meaningful manner.
3. Plan to assess student's understanding.
4. Plan for a lesson closure.

During the class:

Present the lesson plan.

After the class:

Reflect on what worked well and why. If needed, revise the lesson plan.

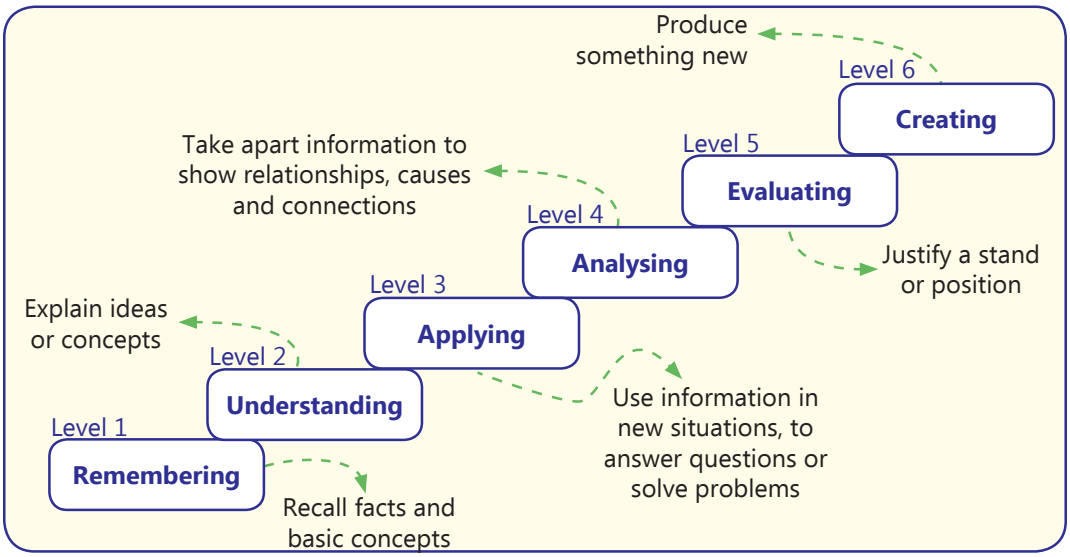
"Knowing yourself is the beginning of all wisdom."

Teaching Strategies

Numerous strategies have evolved over the years to facilitate the teaching-learning process in the classrooms.

Bloom's Taxonomy

Bloom's Taxonomy was created by **Dr Benjamin Bloom** and several of his colleagues, to promote higher forms of thinking in education instead of rote learning. There are three domains of learning: cognitive (mental), affective (emotional), and psychomotor (physical). However, when we refer to Bloom's Taxonomy we speak of the cognitive domain. Bloom's Taxonomy is a list of cognitive skills that is used by teachers to determine the level of thinking their students have achieved. As a teacher, one should attempt to move students up the taxonomy as they progress in their knowledge.



Teachers should focus on helping students to remember information before expecting them to understand it, helping them understand it before expecting them to apply it to a new situation, and so on.

"If you have no confidence in self, you are twice defeated in the race of life."

Class 9

LESSON PLAN

Touchpad Computer Applications

1. Principles of Object-Oriented Programming

Teaching Objectives

Students will learn about

- ☞ Types of Computer Languages
- ☞ Programming Paradigms
- ☞ Principles of Object-Oriented Programming

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about programming languages taught in earlier class and chapters for better understanding of the current topic.

Tell the students about the types of computer languages in detail which are:

- Machine Level Language
- Assembly Level Language
- High Level Language

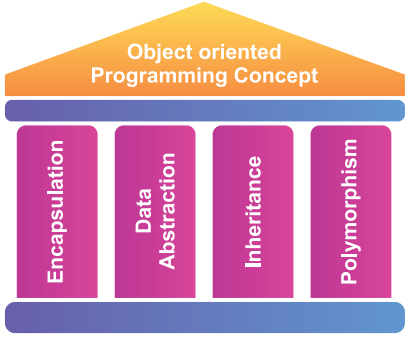
Also, explain the advantages and disadvantages of these in detail.

Share a comparison between three types of computer languages in detail with the students.

Define the programming paradigms to the students. Explain the procedure-oriented programming along with the principles, advantages and disadvantages of the same.

Share the difference between POP and OOP in detail with the students.

Tell the students about the principles of OOPS along with its four pillars:



- Encapsulation
- Data Abstraction
- Inheritance
- Polymorphism

Extension

Ask the students some oral questions based on this chapter.

Q. What is OOP?

Q. What is POP?

Q. Define the following:

a. MLL b. ALL c. HLL

Q. Define the following:

- Encapsulation
- Data Abstraction
- Inheritance
- Polymorphism

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 21 to 24 in the main course book as **Exercise** and **Unsolved Questions**.

2. Introduction to JAVA

Teaching Objectives

Students will learn about

- ☞ Evolution of Java
- ☞ Java Compilation Process
- ☞ Advantages of Java
- ☞ Working with BlueJ
- ☞ Types of Java Programming
- ☞ Features of Java
- ☞ Disadvantages of Java

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier class and chapters for better understanding of the current topic.

Introduce JAVA to the students in detail along with a brief history.

Explain the evolution of JAVA in detail to the students:

Sl. No.	Versions	Years
1	JDK Beta	1995
2	JDK1.0	1996
3	JDK 1.1	1997
4	J2SE 1.2	1998
5	J2SE 1.3	2000
6	J2SE 1.4	2002
7	J2SE 5.0	2004

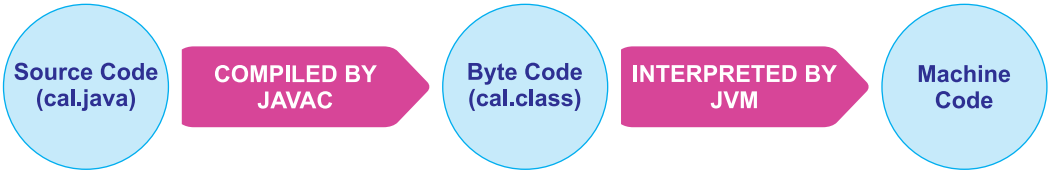
8	Java SE 6	2006
9	Java SE 7	2011
10	Java SE 8	2014
11	Java SE 9	2017
12	Java SE 10 & Java SE 11	2018
13	Java SE 12 & Java SE 13	2019
14	Java SE 14 & Java SE 15	2020
15	Java SE 16	2021

Also, tell the students about the major goals in developing Java language.

Share the types of JAVA programming in detail with the students which are:

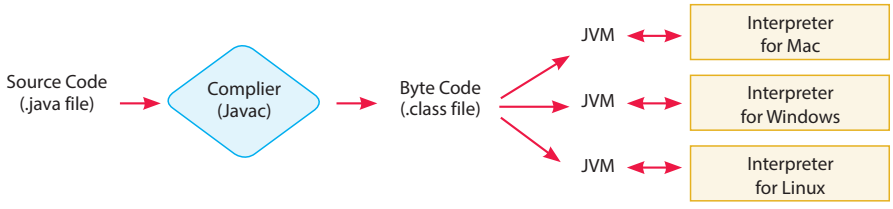
- Java application
- Java Applet

Tell the students about the Java Compilation Process along with the proper steps for better understanding.



Also, explain the role of the following:

- Java Compiler
- Java virtual Machine (JVM)



Explain the following with the students in detail:

- Features of JAVA
- Advantages of JAVA
- Disadvantages of JAVA

Share the detailed and labelled working with BlueJ to the students along with:

- Getting started with BlueJ
- Creating a new project
- Create a class
- Edit a class
- Opening an existing project

Extension

Ask the students some oral questions based on this chapter.

Q. What is JAVA?

Q. What is BlueJ?

Q. Write the features of JAVA.

Q. Write the advantages of JAVA.

Q. Write the disadvantages of JAVA.

Q. What if Java compiler?

Q. Explain JVM.

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 32 to 34 in the main course book as **Exercise** and **Unsolved Questions**.

3. Elementary Concept of Objects and Class

Teaching Objectives

Students will learn about

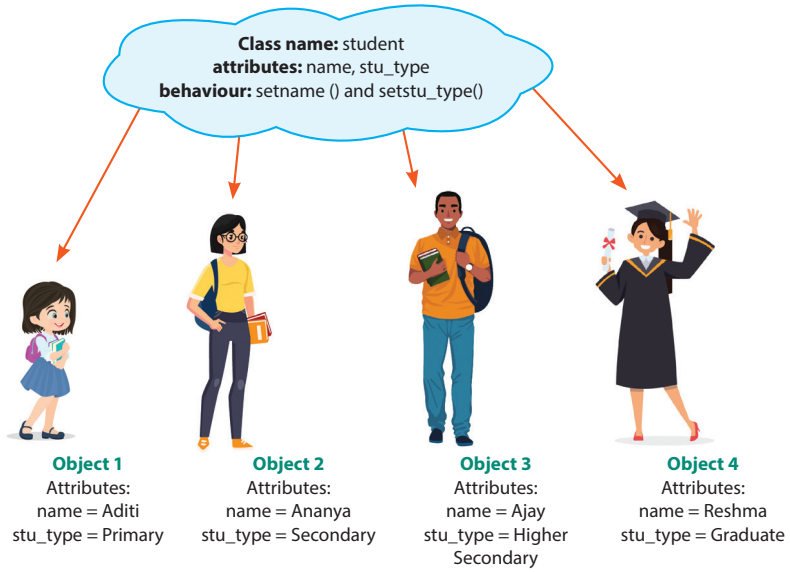
- ☞ Concept of Classes and Objects
- ☞ Object in Java
- ☞ Properties of Class and Object
- ☞ Class in Java
- ☞ Difference between Class and Object

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapter for better understanding of the current topic.

Explain the concept of Classes and Objects in detail to the students with proper examples for better understanding of the topic.



Define Class in java to the students in detail for better understanding along with the components:

- Access Specifier
- "class" keyword
- Class name
- Data members
- Methods

Tell the students how to define a class in JAVA with proper examples and steps.

Define Objects in JAVA to the students along with the steps to create an object of a class. Also, tell them how to pass message between objects.

Share the difference between Class and Object:

Class	Object
Class is the blue print from which objects are created.	Object is an instance of a class.
It is a logical entity.	It is a physical entity.
No memory space is acquired when it is created.	Memory space is allocated when an object is created.
Used to define only once.	It is created as many times as it is needed.

Define the properties of Class and Object to the students:

- Class is an Object Factory
- Object is an Instance of a Class
- Class is a User-defined Data Type

Extension

Ask the students some oral questions based on this chapter.

Q. Define Class.

Q. Define Object.

Q. What is the difference between a class and an object?

Q. Define the following components of a class:

- Access Specifier
- "class" keyword
- Class name
- Data members
- Methods

Q. Define the properties of an object.

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 40 to 43 in the main course book as **Exercise** and **Unsolved Questions**.

4. Values and Types

Teaching Objectives

Students will learn about

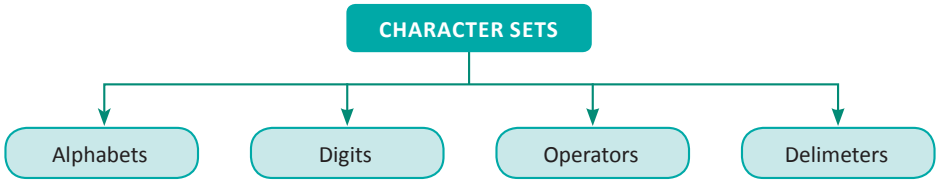
- ☞ Character Sets in Java
- ☞ Escape Sequences
- ☞ Data Types
- ☞ Type Conversion
- ☞ How Characters are Stored in Memory?
- ☞ Token
- ☞ Variable

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapter for better understanding of the current topic.

Define the character sets in Java to the students:



Tell the students about how characters are stored in memory. Also, tell them the types of encoding procedures along with advantages and disadvantages of the same:

- ASCII Code
- Unicode

Share with the students about the difference between ASCII and Unicode:

ASCII Code	Unicode
ASCII stands for American Standard Code for Information Interchange.	Unicode stands for Universal Character Encoding.
Standard ASCII character set only supports 128 characters (character range whose numeric value is between 0–127).	Unicode supports a wide range of characters. (0–221).
ASCII only uses one byte to represent each character.	Unicode supports up to 4 bytes for each character.
Unicode requires more space.	ASCII code requires less space.

Define the meaning of Escape Sequences and describe each of them with their purpose:

Escape Sequence	Description
\t	Used to insert a Horizontal tab.
\b	Used to insert a backspace.
\n	Used to insert a newline.

\r	Used to insert a carriage return.
\f	Used to insert a form feed.
\'	Used to insert a single quote character.
\"	Used to insert a double quote character.
\\	Used to insert a backslash character.

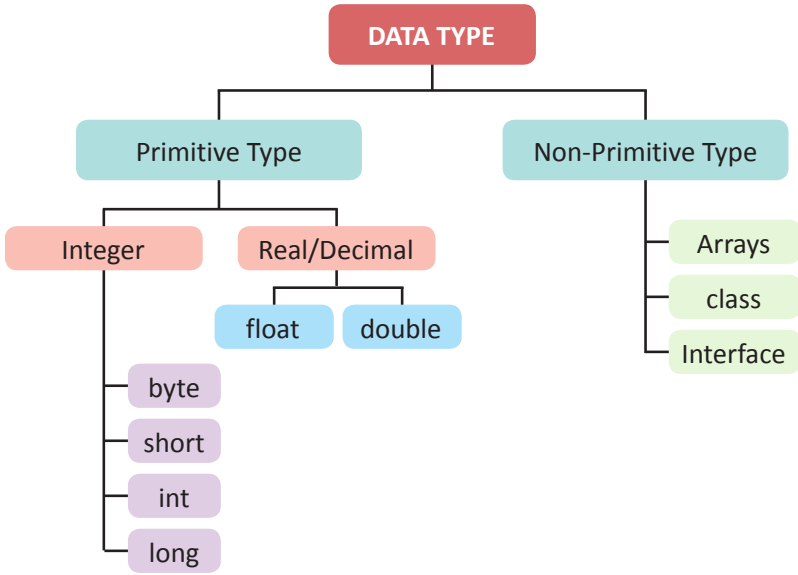
Tell the students about how to use Escape Sequence in BlueJ and tell their purpose with an example program:

- Horizontal Tab
- New Line
- Double Quote
- Single Quote
- Backspace
- Form Feed
- Carriage Return
- Back Slash

Explain the meaning of token to the students along with the different types of tokens which are:

- Keywords
- Identifiers
- Literals
- Operators
- Punctuators
- Separators

Share the meaning of data types with the students along with the types:



Define Variable to the students along with the functions you can perform on it:

- Declaring a variable
- Initialize a variable

Define the meaning and purpose of type conversion which are:

- Implicit Type
- Explicit Type

Extension

Ask the students some oral questions based on this chapter.

Q. What are character set?

Q. Define:
- Alphabets
- Digits
- Operators
- Delimeters

Q. What is the difference between ASCII Code and Unicode?

Q. What are escape sequence?

Q. Define the function of the following:
- Horizontal Tab
- New Line
- Double Quote
- Single Quote
- Backspace
- Form Feed
- Carriage Return
- Back Slash

Q. What is a token?

Q. Define the following:
- Keywords
- Identifiers
- Literals
- Operators
- Punctuators
- Separators

Q. What is data type?

Q. What is data type conversion?

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 66 to 71 in the main course book as **Exercise** and **Unsolved Questions**.

5. Operators in JAVA

Teaching Objectives

Students will learn about

- ☞ Operators
- ☞ Types of Operators
- ☞ Hierarchy of Operators
- ☞ Output Statement
- ☞ Forms of Operators
- ☞ Special Operators in Java
- ☞ Associativity of Operators

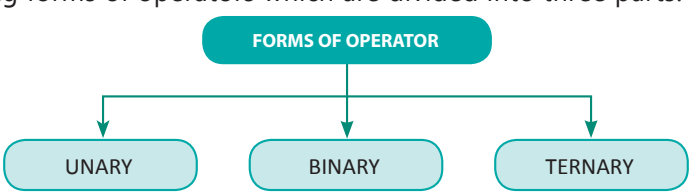
Teaching Plan

Number of Periods	
Theory	Practical
3	1

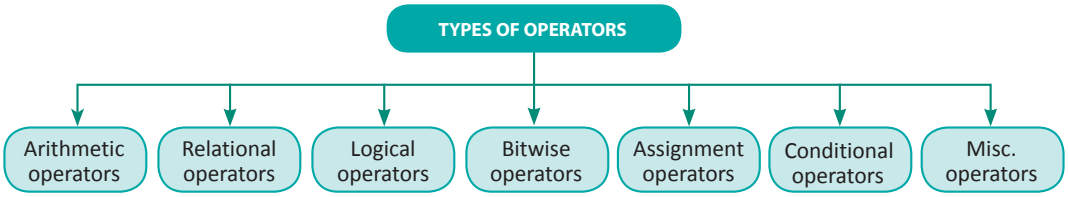
Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

Tell the students what is an operator and how it is used in Java in detail with suitable examples.

Define the following forms of operators which are divided into three parts:



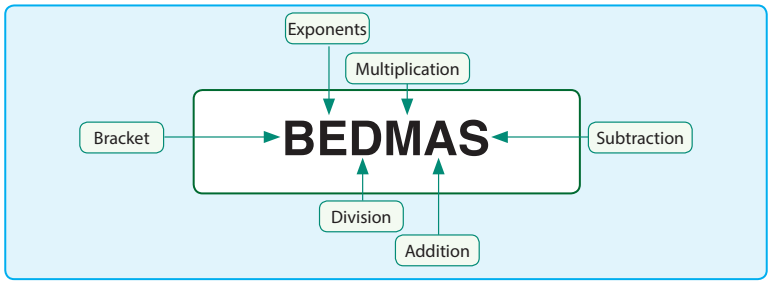
Share the types of operators with the students in detail:



Define the special operators in Java which are:

- Dot (.) Operator
- New Operator

Explain the hierarchy of operators to the students for the better understanding of the topic in detail:



Hierarchy	Operators	Precedence
1.	postfix unary	++, --
2.	unary including prefix, logical NOT	++, --, +, -, ~ ,!
3.	multiplication, division and modulus	*, /, %
4.	addition and subtraction	+, -
5.	shift	<<, >>, >>>
6.	relational	<, >, <=, >=
7.	equality, non-equality	==, !=
8.	bitwise AND	&
9.	bitwise exclusive OR	^
10.	bitwise inclusive OR	|
11.	logical AND	&&
12.	logical OR	||
13.	ternary	? :
14.	assignment including shorthand	=, +=, -=, *=, /=, %=, &=, ^=, |=, <<=, >>=, >>>=

Tell the students about the associativity of operators which is:

Operators	Associativity
postfix unary	Right to Left
unary including prefix, logical NOT	Right to Left
multiplication, division and modulus	Left to Right
addition and subtraction	Left to Right

Define the purpose of Output statement to the students in detail.

Extension

Ask the students some oral questions based on this chapter.

Q. What is an operator?
Q. Define the forms of operators.
Q. What are the types of operators?
Q. What are special operators?
Q. Explain the hierarchy of operators.
Q. What is associativity of operators?

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 97 to 101 in the main course book as **Exercise** and **Unsolved Questions**.

6. Input in JAVA

Teaching Objectives

Students will learn about

- ☞ Comments in Java
- ☞ Initialization
- ☞ Using Scanner Class
- ☞ Errors in Java
- ☞ Exception Handling in Java
- ☞ Packages in Java
- ☞ Input using Parameters
- ☞ Using InputStreamReader Class
- ☞ Testing and Debugging

Teaching Plan

Number of Periods	
Theory	Practical
4	2

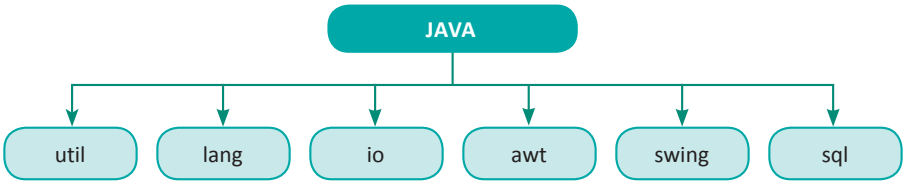
Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

Tell the students that while writing a program code, we might need to explain certain parts of the program. This helps us to understand the reason to write the statements. This can be done with the help of **"Comments"**.

Also tell them the types of comments:

- Single line
- Multiline
- Documentation

Tell the students what are packages in Java and their types in detail:



Explain the initialization to the students along with the ways:

1. The value is assigned at the time of declaration.
2. The value is assigned after declaring the variable.

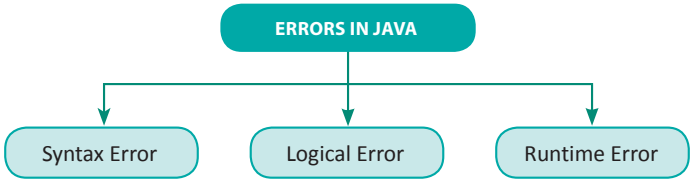
Tell the students about how to use input using parameters by defining two ways:

- Using Command Line Arguments
- During Method Call

Define the use of Scanner class to the students with the help of suitable programs, methods and examples.

Tell the students how to use InputStreamReader Class along with the methods used for the same.

Demonstrate what are errors in Java along with the types, examples and programs:



Define texting, debugging and exception handling in Java in detail with suitable programs and examples to the students.

Extension

Ask the students some oral questions based on this chapter.

Q. What are comments?
Q. What are packages?
Q. What is initialization?
Q. How to use Input in JAVA?
Q. What is the use of Scanner class?
Q. What are errors in Java?
Q. Define the following:
   a. Testing
   b. Debugging
   c. Exception Handling

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 120 to 123 in the main course book as **Exercise** and **Unsolved Questions.**

7. Mathematical Library Methods

Teaching Objectives

Students will learn about

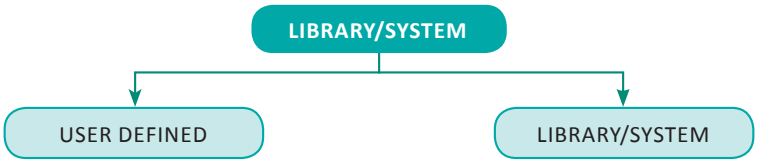
- ☞ "java.lang" Package
- ☞ Mathematical Methods

Teaching Plan

Number of Periods	
Theory	Practical
3	1

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

Tell the students that there are two types of methods in Java:



Define Java.lang package to the students and tell them it is a default package.

Define the mathematical methods to the students along with the function, syntax and description:

Function Name	Syntax	Description
Math.min	Math.min (value1, value)	Returns the smaller value
Math.max	Math.max (value1, value2)	Returns the larger value
Math.sqrt	Math.sqrt(value)	Returns the square root of the value
Math.cbrt	Math.cbrt(value)	Returns the cube root of the value
Math.pow	Math.pow (value1, value2)	Returns the result of $(value1)^{value2}$
Math.abs	Math.abs(value)	Returns the positive value
Math.round	Math.round (value)	Returns the nearest integer value
Math.ceil	Math.ceil (value)	Returns the smallest integer value greater than the given argument
Math.floor	Math.floor (value)	Returns the largest integer value smaller than the given argument
Math.rint	Math.rint (value)	Returns the trimmed value of the argument
Math.random	Math.random()	Returns any value between 0 and 1
Math.log	Math.log(value)	Returns the natural logarithm of the value
Math.exp	Math.exp(value)	Returns the exponent: e^{value}

Extension

Ask the students some oral questions based on this chapter.

Q. What are methods in Java?

Q. Define two types of methods.

Q. Define mathematical methdos.

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 135 to 139 in the main course book as **Exercise** and **Unsolved Questions**.

8. Conditional Construct in Java

Teaching Objectives

Students will learn about

- ☞ Flow of Control
- ☞ Difference between if Statement and switch Statement
- ☞ Terminating a Program using system.exit()

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

Tell the students about the flow of control and define the types also:

- Normal
- Conditional
- Multiple

Explain the difference between IF statement and Switch statement to the student:

if statement	switch statement
The flow of control is bidirectional.	The flow of control is multidirectional depending on the choice
All kinds of the relational operators are used for checking.	Checking is satisfied if the choice variable is matching the case value.
Any data type can be used for checking.	Only int and char data types are used for checking.
More efficient in case a value is to be tested against a set of constants.	Switch can test only for quality, so for the rest of comparisons one needs to use if-else.

Explain how to terminate a program to a student using System.exit( ) with the help of proper programs and examples.

Extension

Ask the students some oral questions based on this chapter.

Q. What is flow of control?

Q. Define the following types of flow of control:

a. Normal b. Conditional c. Multiple

Q. What is the difference between IF statement and Switch statement?

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 168 to 173 in the main course book as **Exercise** and **Unsolved Questions**.

9. Iterative Constructs in Java

Teaching Objectives

Students will learn about

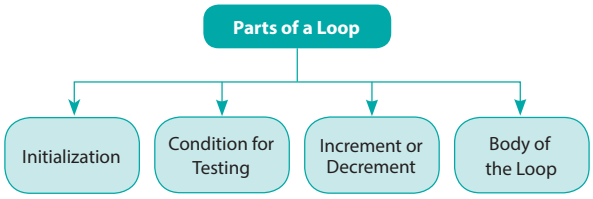
- ☞ Loop
- ☞ Different Forms of Loops
- ☞ Categories of Loop

Teaching Plan

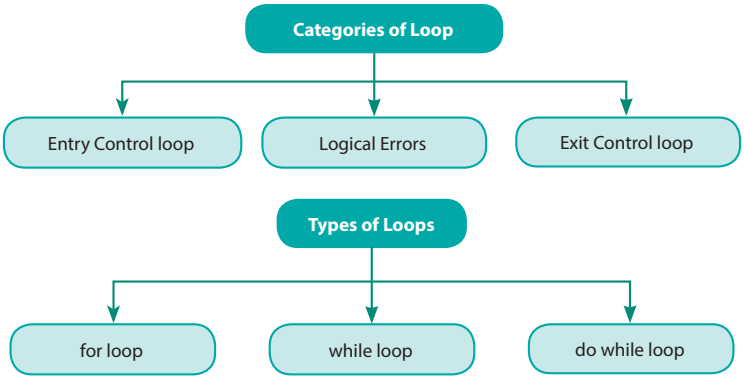
Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

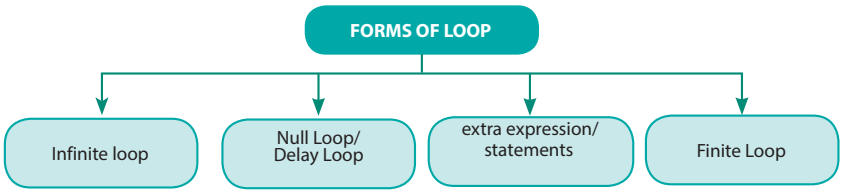
Define the meaning of Loops to the students and different parts of a loop:



Explain the categories and types of loop in detail to the students:



Define the different forms of loops to the students in detail with proper examples and programs:



Extension

Ask the students some oral questions based on this chapter.

Q. What is loop?
Q. Different parts of a loop.
Q. Write about categories of loop.
Q. What are the types of loop?
Q. What are the forms of loop?

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 208 to 216 in the main course book as **Exercise** and **Unsolved Questions**.

10. Nested Loop

Teaching Objectives

Students will learn about

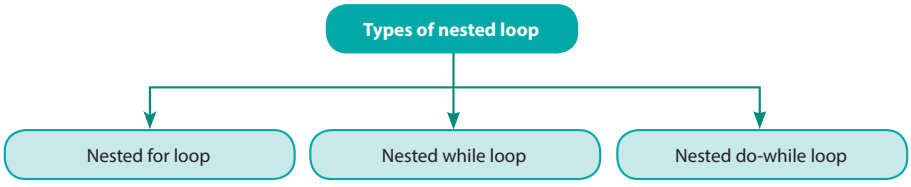
- Nested for Loop
- Nested do-while Loop
- Using continue Statement
- Nested while Loop
- Using break Statement

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about JAVA topics taught in earlier chapters for better understanding of the current topic.

Tell the students about Nested loop and share their types also.



Define nested for loop in detail with suitable example and programs.

```
    for (initialization; condition; increment) // step of outer loop
    {
    for (initialization; condition; increment) // step of inner loop
    {
    // statement of inside loop
    }
    // statement of outer loop
}
```

Tell the students about the Nested While loop.

```
    while(condition) //condition of outer loop
    {
    initialization; //initialization of inner loop
    while(condition) //condition of inner loop
    {
    // statement of inside loop
    increment/decrement; //incre or decre of inner loop
    }
    // statement of outer loop
    increment/decrement; //incre or decre of outer loop
}
```

Tell the students about nested Do-while loop.

```
    initialization; //initialization of outer loop
    do { //outer do loop
    initialization; //initialization of inner loop
    do { //outer do loop
    // statement of inside loop
    increment/decrement; //incre or decre of inner loop
    } while(condition); //condition of inner loop
    // statement of outer loop
    increment/decrement; //incre or decre of outer loop
} while(condition); //condition of outer loop
```

Explain how to use break statement with the help of proper examples and programs for better understanding.

Explain how to use continue statement with the help of proper examples and programs for better understanding.

Extension

Ask the students some oral questions based on this chapter.

Q. What is nested loop?

Q. What is nested for loop?

Q. What is nested while loop?

Q. What is nested do-while loop?

Q. Write the use of break statement.

Q. Write the use of continue statement.

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 236 to 240 in the main course book as **Exercise** and **Unsolved Questions**.

11. Computing and Ethics

Teaching Objectives

Students will learn about

- ☞ Intellectual Property
- ☞ Protection Against Spam
- ☞ Cybercrime
- ☞ Malicious Intent and Code
- ☞ Protection of Individual's Right to Privacy
- ☞ Software Piracy
- ☞ Hacking
- ☞ Good Etiquette Practices

Teaching Plan

Number of Periods	
Theory	Practical
3	2

Before starting the chapter, make the students to revise about basic computing ethics and topics taught in earlier chapters for better understanding of the current topic.

Tell the students that Intellectual Property Rights grant various exclusive rights to the rightful owner of a variety of creations like musical, artistic and literary assets. This rights are not only limited to the inventions but they can also be applied to new discoveries.

Explain to the students that there are four types of intellectual property rights:

- Patents
- Trademarks
- Copyrights
- Trade Secrets

Explain the students that the word privacy means to be free of any public attention. In other words, that person has all the rights to keep his or her decisions or actions free of any public attention or influence. Also, explain them the following in detail and with proper examples:

- Data Privacy
- Data Protection on the Internet
- Data Protection Act

Show the students how to imply protection against spam along with advantages, disadvantages and ways to separate spam from other emails.

Tell the students about Software Piracy and define the types of piracy which includes:

- Counterfeiting
- Internet Piracy
- End User Policy
- Client-Server Overuse
- Hard-Disk Loading

Also, tell them about the steps to avoid software piracy.

Explain the students any crime that is done through Internet and by using Computer/Mobile/Laptop and software is known as Cybercrime.

Tell the students about the common types of cybercrime which includes:

- Phishing
- Hacking
- Cyber Terrorism
- Cyber Abuse
- Grooming
- Cyberstalking
- IP Snooping
- Cyberwarfare

Also, explain them how to protect oneself against cybercrime.

Tell the students that hacking refers to the illegal act of breaking into someone else's computer with the intent of stealing information, installing malware or disrupting their services.

Explain the common types of hacking to the students which includes:

- Data Theft
- Industrial Espionage
- Publicity
- Revenge
- Fun
- Knowledge

Define the concept of malicious intent and code to the students. Also, explain the protection against malicious code in detail.

Explain the meaning of the word etiquette to the students and after that explain the meaning of good etiquette practices to the students for better and clear understanding of the topic.

Extension

Ask the students some oral questions based on this chapter.

Q. What is intellectual property?
Q. What are intellectual rights of an individual?
Q. Explain the protection of individual right's to privacy.
Q. How can we imply protection against spam?
Q. What is software piracy?
Q. What is cyber crime?
Q. What is hacking?
Q. Explain the malicious intent and code.
Q. Explain the good etiquette practices.

Evaluation

After explaining the chapter, let the students do the exercises given on Pages 248 to 251 in the main course book as **Exercise** and **Unsolved Questions**.