UNIT-VI: Alternative Paradigm: Scripting Languages

Faculty In-charge

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Aim: To implement mini project by group of 3-4 students, using different Programming Languages for Web Development.

Execution:

- Each group is assigned the task of building a simple web application with similar functionality, such as a to-do list or a blog site.

- The Python group will use Django framework, the JavaScript group will use Node.js and Express.js, and the Ruby group will use Ruby on Rails.

- Participants will have a fixed amount of time to complete the development of their respective web applications.

- Participant will present their work at the end.

- Time =10 min
- Slides 4-5

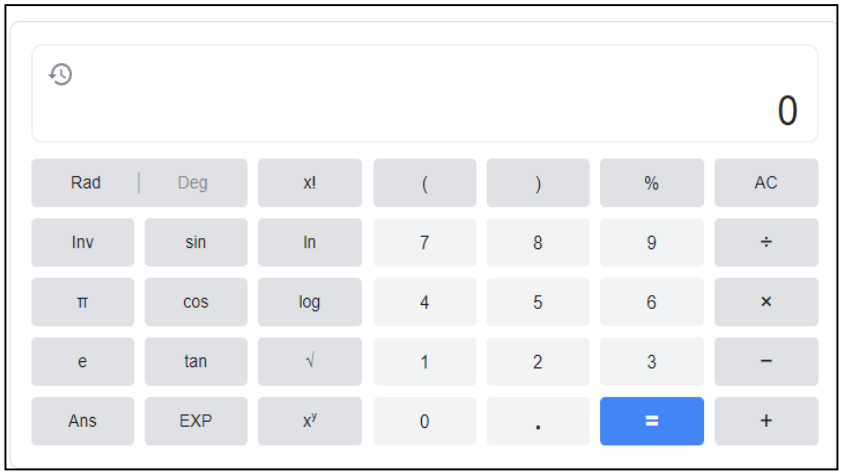
Batch	Dates
Batch -1	4/10/2023 (L) and 19/10/2023
Batch-2	3/10/2023 (P) and 5/10/2023 (L)
Batch -3	16/10/2023 (L) and 18/10/2023 (L)

What the presentation should contain-

1. Introduction slide (Title, names of students, date, class, div)
2. Aim/Objective, Tools and Language uses
3. Methodology and working
4. Conclusions and references
5. Post your code in GitHub, make a small demo video

Introduction

- The scripting language is basically a language where instructions are written for a run-time environment.
- They do not require the compilation step and are rather interpreted.
- A scripting language is a programming language designed for integrating and communicating with other programming languages.



(Bash, Node js, Ruby, Python, Perl, JavaScript)

(C, C++, Java, Python, Haskell...)

Introduction (Continued...)

Generally, there are two types of scripting are as follows:

Server-side scripting languages: It runs on a web server. Where a client sends a request to the server and it responds via HTTP.

- The most popular server-side scripting languages and frameworks include **PHP**, ASP.NET, Node. **js**, **Java**, **Ruby**, **Perl** and **Python**.
- These scripts run on a web server and respond to client requests via HTTP to deliver dynamic and customized content to the user

Client-side scripting languages: It runs on the client end on their web browser. It reduces the demand on the server by allowing web pages to load faster.

-
- The most common client side scripting languages are JavaScript, VBScript, HTML, CSS, AJAX, jQuery

Provides instructions for website and styling

Provides facility to insert mathematical operation in the website

Difference: Programming Language and Scripting

Sr.	Scripting Language	Programming Language
1	A scripting language is a language that uses a naive method to bring codes to a runtime environment	A Programming language is a language which is used by humans to navigate their communication with computers.
2	These are made for a particular runtime environment.	Programming languages are of three types -: low-level, Middle-level and High-level
3	They are used to create dynamic web applications	Programming languages are used to write computer programs.
4	Example -: Bash, Ruby, Python	Example -: C, C++, Java,
5	Scripting languages can be easily ported among various operating systems.	Programming languages are translation free languages
6	These languages requires a host.	These languages are self executable.
7	Do not create a ***.exe*** file.	These generate ***.exe*** files.
8	Most of the scripting languages are interpreted	Most of the programming languages are compiled .
9	All the scripting languages are programming languages.	All the programming languages are not scripting languages.

Examples of Scripting Languages

- Bash
- Node.js
- PowerShell
- Ruby
- PERL
- CGI
- Tcl
- Python
- PHP
- ASP
- JSP
- ASP.NET
- VB-Script
- Java-Script
- AWK (text-processing)

Common Characteristics of Scripts

1. Both batch and interactive use
2. Economy of expression (Short sentences)
3. Lack of declarations; simple scoping rules.
4. Flexible dynamic typing
5. Easy access to other programs
6. Sophisticated pattern matching and string manipulation
7. High level data types (lists, tuples dictionary etc)

Common Characteristics of Scripts

1. Both batch and interactive use

- Most of the scripting languages are interpreted and do not need compiler
- Perl has JIT compiler that reads entire program in advance
- Other languages are interpreted one line at a time
- Python, Tcl and Ruby accept command from keyboard

Common Characteristics of Scripts

2. Economy of expression

- Perl makes heavy use of punctuations and short identifiers whereas other languages use English like functionality
- To support rapid development and interactive use, scripting language require very little code
- E.g Java Vs Python
- Java program to print Hello world

```
class Main{
    public static void main(String[] args) {
        System.out.println("Hello World");
        }
}
```

- Python program to print Hello world

```
print Hello world
```

Common Characteristics of Scripts

3. Lack of declarations; simple scoping rules.

- Most scripting language donot use declarations
- They use simple rules to govern the scopes of names (identifiers)
- In perl every name is global by default
- In Tcl, Php, everything is local by default
- In Python , every variable that is assigned a value Is local to the block where assignment appears
- Special syntax is required to access a variable from surrounding scope

Common Characteristics of Scripts

4. Flexible dynamic typing

- Most scripting languages are dynamically typed
- In php, Ruby, Python, a type of variable is checked just before its use
- In Tcl (Tool Command Language) and Perl (Practical Extraction and Reporting Language), variable can be interpreted diffently in different context and things are more dynamic.

$a =‘4’

Print $a . 3 . “\n”

Print $a + 3 . “\n”

Ans: 43

Ans: 7

Common Characteristics of Scripts

6. Sophisticated pattern matching and string manipulation:

- Scripting languages have very good facilities for pattern matching, searching and string manipulations
- Sed is powerful for text processing

7. High level data types:

- High level data types such as sets, dictionaries, lists and tuples are also provided by scripting languages
- Python dictionary can map key to a value
- Garbage collection is automatic so user does not have to deal with heap or stack memory issues.

Advantages of scripting languages:

Easy learning: The user can learn to code in scripting languages quickly, not much knowledge of web technology is required.

Fast editing: It is highly efficient with the limited number of data structures and variables to use.

Interactivity: It helps in

- Adding visualization interfaces and combinations in web pages.
- To create enhanced web pages, fascinated visual description which includes background and foreground colors and so on.

Functionality: There are different libraries which are part of different scripting languages. They help in creating new applications in web browsers and are different from normal programming languages.

Characteristics-

1. Economy of expression.

```
class Hello {
    public static void main(String[] args) {
        System.out.println("Hello, world!");
    }
}
```

and like this in Ada,

```
with ada.text_IO; use ada.text_IO;
procedure hello is
begin
    put_line("Hello, world!");
end hello;
```

in Perl, Python, or Ruby it is simply

```
print "Hello, world!\n"
```

2. Lack of declarations; simple scoping rules.

   - Most scripting languages dispense with declarations, and provide simple rules to govern the scope of names.
   - In some languages (e.g., Perl) everything is global by default.
   - In other languages (e.g., PHP and Tcl), everything is local by default; globals must be explicitly imported.
   - Python adopts the interesting rule that any variable that is assigned a value is local to the block in which the assignment appears.

Characteristics-

3. Flexible dynamic typing

- Most scripting languages are dynamically typed.
- In some (e.g., PHP, Python, Ruby, and Scheme), the type of a variable is checked immediately prior to use.
- In others (e.g., Rexx, Perl, and Tcl), a variable will be interpreted differently in different contexts.

```
$a = "4";
print $a . 3 . "\n";     # '.' is concatenation
print $a + 3 . "\n";     # '+' is addition
```

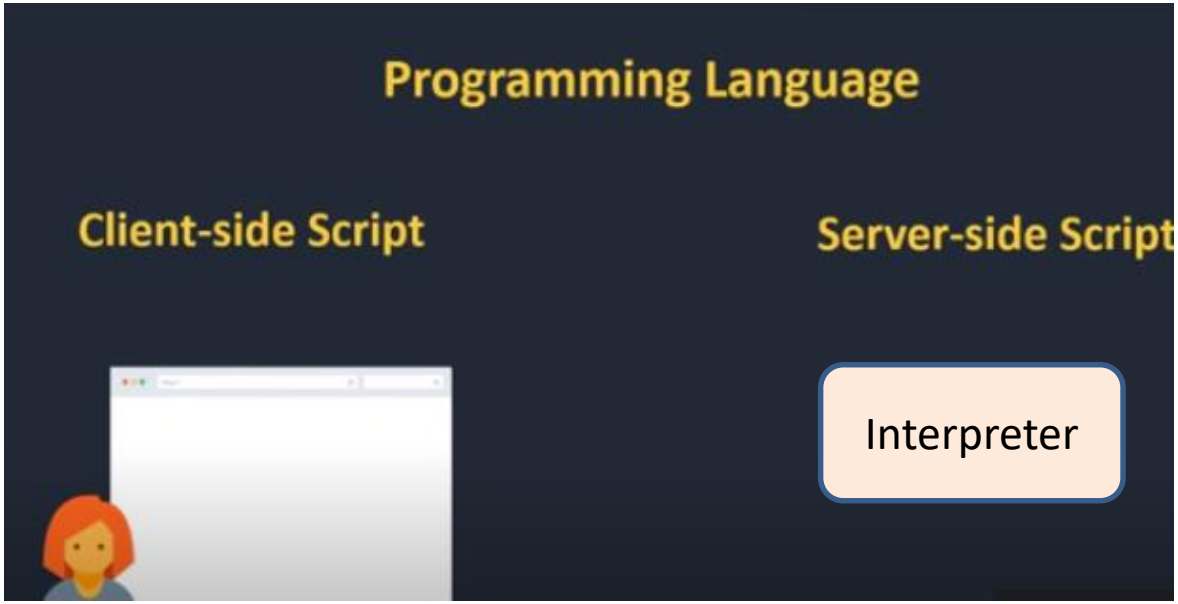
will print

```
43
7
```

4. Easy access to system facilities

6.1: Use in web development

- The scripts can be of two types depending on the use as : server side scripting or client side scripting.
- In a typical client server application, the server side scripts are run and used at server while client side scripts runs in the browser of the client.
- Client side scripts are useful for local calculations and display of the data.
- Client side script do not interact with server while running the script.
- The server side scripts run on the web server and process data at the web server.
- Server side scripting languages can use more features for processing of data.
- Connecting with database, rendering of the GUI, complex data calculations are some of the important tasks performed at server side.
- Server side scripting is the communication medium between client and server.



Executes the code on detection of client activities.
Gets executed on the browser

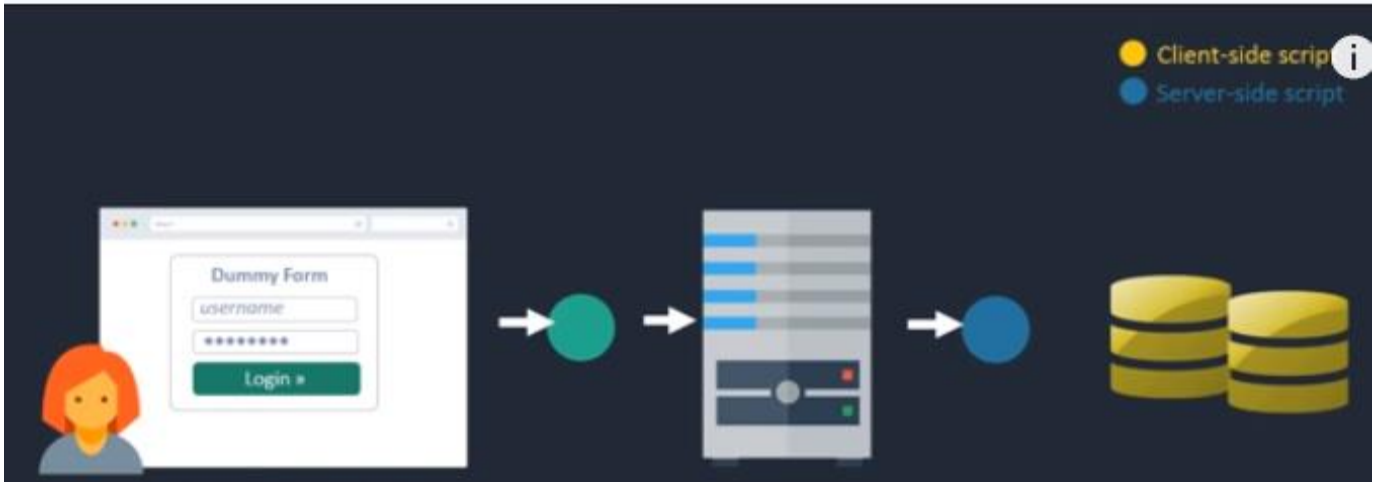
1. User click, double click, mouse hover, page load (pop-ups), mouse enter
2. Form data submission (form validation happens on form submission)
3. Display of success/ failure messages

Ex: JavaScript

Server side script is sent by the browser to the server. It gets interpreted by the interpreter present in the server

Ex PHP

Client side script cannot interpret server side script



- ✓ File creation
- ✓ File modification
- ✓ File read/write/deletion
- ✓ Database creation
- ✓ Database reading
- ✓ Database modification

https://www.youtube.com/watch?v=82RUmuGA8aM

CLIENT SIDE SCRIPTING	SERVER SIDE SCRIPTING
Source code is visible to user.	Source code is not visible to user because it's output of server side is a HTML page.
It usually depends on browser and it's version.	In this any server side technology can be use and it does not depend on client.
It runs on user's computer.	It runs on web server.
There are many advantages link with this like faster. response times, a more interactive application.	The primary advantage is it's ability to highly customize, response requirements, access rights based on user.
HTML, CSS and javascript are used.	PHP, Python, Java, Ruby are used.

HTML (head, title, paragraph, break, header tags, underlined, strong)

tut3.html - Notepad

File Edit Format View Help

```
<!doctype html>
<!--creating para,bold, italics-->
<html>
        <head>
        <meta charset="utf-8"/>
        <title> Iam the title, U cannot see me</title>
        </head>
        <body>
        <p>My name is Mrinmoyee
        <br> My surname is Mukherjee
        <br> I work at SFIT
        </p>
        <hr/>
        <br><p>I work as Assistant Professor
        <br> I have a <strong>beautiful</strong> daughter named <em>water</em><p>
        <h1>hello</h1>
        <h2>hello</h2>
        <h3>hello</h3>
        <h6>hello</h6>
        <h4><ul>Iam Underlined word</ul><h4>
        </body>
</html>
```

<meta charset="utf-8"> tells the browser to use the utf-8 character **encoding when translating machine code into human-readable text and vice versa to be displayed in the browser**

HTML (Paragraph colour, ordered list, unordered list)

tut4.html - Notepad

File Edit Format View Help

```
<!doctype html>
<!--Creating Ordered and unordered lists-->
<html>
<head>
<title>
Creating lists--
</title>
</head>
<body>
<p style="color:red;">Red Paragraph text
<br>I love red color
</p>
<p style="color:rgb(0,255,0);">Green paragraph text
<br>I love green color
</p>
<ul>   <!--Unordered lists-->
<li>Books </li>
<li> tables </li>
<li> Games </li>
</ul>

<!--Creating ordered lists-->
<ol>
<li> Go to youtube </li>
<li> Subscribe </li>
<li> Practise Practise </li>
</ol>
</body>
</html>
```

HTML (Creating links)

*tut5.html - Notepad

File Edit Format View Help

```
<!doctype html>
<!--Linking to another page-->
<html>
<head>
<title>
Creating lists--
</title>
</head>
<body>
<a href="tut4.html"> This is tut4 page visit </a>
<br><a href="http://www.google.com">google site </a>
</body>
</html>
```

HTML (Inserting Images)

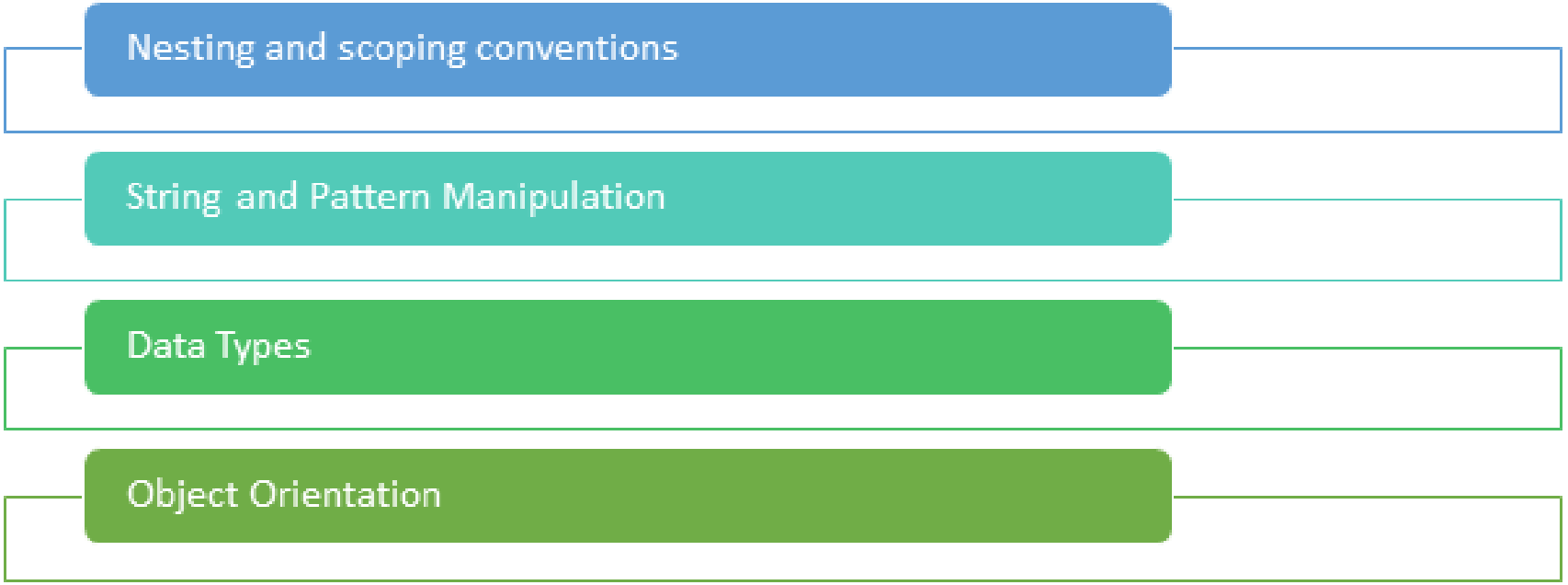
tut7.html - Notepad

File Edit Format View Help

```
<!doctype html>
<!--Image Display and Manipulations-->
<html>
<head>
<title>
Images
</title>
</head>
<body>
<h2> Regression Analysis </h2>
<img src="anat.png" alt="Image not Found" width="500" height="500" Align= left border=5  HSPACE=50 Vspace=15>
<!-- alt will display the text if image is not found, height and width are used to resize the image-->
<!--Align is used to provide alignment-left,right, centre-->
<!--border will will provide ,hspace and vspace will provide horizontal and vertical displacement in form of no
</body>
</html>
```

HTML (Form Attributes)....give it directly to students

6.2: Innovative Features



Nesting and scoping conventions: These vary quite a bit like Scheme, Python, JavaScript languages provide the combination of nested subroutines and static scoping and Tcl provide subroutines to nest and uses dynamic scoping.

String and Pattern Manipulation: In many scripting languages regular expressions are present and related tools provide extended versions of the notation in sed, awk, Perl, Tcl, Python, and Ruby grep.

Data types: In most scripting languages they do not require the declaration of types for variables. For example, Scheme, Python, and Ruby languages perform extensive run-time checks to avoid repeated values.