

Software Engineering Tools Lab

Assignment No-2

(Module 2- Software Development Frameworks)

1. List of Frameworks/IDEs/Softwares

Eclipse-

1. Original author :IBM
2. Developers :Eclipse Foundation
3. Initial release :1.0 / 29 November 2001
4. Stable release : 4.26.0 / 7 December 2022
5. Preview release :15 March 2023
6. Repository (with cloud support) :
7. Written in (Languages) :Java and C language
8. Operating System support :

Eclipse is a cross-platform software platform and can run on the following operating systems:

Windows: Windows 7 or later (32-bit or 64-bit)

macOS: macOS 10.15 (Catalina) or later (64-bit)

Linux: Linux distributions that support GTK 3, including Ubuntu and Fedora (64-bit)

9. Platform ,portability :Eclipse is a cross-platform software platform that can run on various operating systems including Windows, macOS, and Linux. This means that developers can use the same development environment on different systems, which can improve productivity and reduce the need to switch between different tools.
10. Available in (Total languages) : Java , C/C++, Python, PHP, Scala ,Perl ,Groovy
11. List of languages supported : Java , C/C++, Python, PHP, Ruby ,Perl ,Groovy ,XML
12. Type (Programming tool, integrated development environment etc.)
13. Website : <https://www.eclipse.org/>
14. Features :

- Code Editing : Eclipse provides an advanced code editor with features such as code highlighting, code folding, and automatic indentation, making it easier to write and maintain code.
- B . Debugging: Eclipse includes a comprehensive debugging environment that allows developers to step through code, set breakpoints, inspect variables, and view the call stack.
- Code Refactoring: Eclipse provides code refactoring tools that help developers restructure and improve the quality of their code, making it easier to maintain and evolve over time.

15. Size (in MB, GB etc.) :182 MB

16. Privacy and Security: Eclipse is an open-source software platform, and as such, the privacy and security of the software is dependent on the community of contributors who maintain and develop the platform. In general, open-source software has the potential to be more secure than proprietary software, as the code is available for review by the community

17. Type of software (Open source/License)

18. If License- Provide details. :Eclipse is an open-source software platform and is released under the Eclipse Public License (EPL). The EPL is a free software license that allows users to use, modify, and distribute the software for any purpose, commercial or non-commercial.

19. Latest version : 4.11(2019-03)

20. Cloud support (Yes/No): Eclipse does not have its own cloud support but it can be run on cloud platforms such as Amazon Web Services (AWS) and Microsoft Azure.

21. Applicability :

- a.Java Development: Eclipse is particularly well-suited for Java development, and provides a range of tools and plugins specifically designed for this purpose, including a Java development kit, code refactoring tools, and integrated debugging.
- b.Web Development: Eclipse can be used for web development, with support for HTML, CSS, JavaScript, and other web technologies.
- c.Mobile Development: Eclipse supports mobile development, with tools for developing Android apps, and plugins for other mobile platforms

22. Drawbacks (if any) :

- Resource Intensive: Eclipse can be resource-intensive and may require a powerful computer, especially when working with large projects or running multiple plugins.
- Complexity: Eclipse can be complex to set up and use, especially for new users, and may require a learning curve to master all its features and plugins.
- Slow Performance: Eclipse can be slow at times, particularly when working with large projects or using multiple plugins, which can impact productivity.

Node.Js: -

Original author: Ryan Dahl

Developers: OpenJS Foundation

Initial release: 2009

Stable release: v14.16.0 (2022-12-08)

Preview release: v15.0.0 (2022-10-19)

Repository (with cloud support): <https://github.com/nodejs/node>

Written in (Languages): JavaScript and C++

Operating System support: Windows, macOS, Linux, and Unix

Platform, portability: Cross-platform

Available in (Total languages): Not specified

List of languages supported: JavaScript

Type (Programming tool, integrated development environment etc.): JavaScript runtime environment

Website: <https://nodejs.org/>

Features:

Asynchronous event-driven programming

Support for multiple programming paradigms (e.g. procedural, functional, and object-oriented)

Built-in modules for various tasks (e.g. HTTP, file system, and cryptography)

Large, active community and robust ecosystem with numerous packages available

Can be used with popular frontend frameworks such as React and Angular.

Size (in MB, GB etc.): Not specified

Privacy and Security: Open source and third-party packages may have vulnerabilities. It is up to the developers to keep their applications secure.

Type of software (Open source/License): Open Source, licensed under the MIT License.

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Anaconda -

Original author: Continuum Analytics

Developers: Anaconda, Inc.

Initial release: 2012

Stable release: Anaconda Navigator 1.13.1 (2022-10-07)

Preview release: N/A

Repository (with cloud support): Anaconda Repository (<https://anaconda.org/>), Anaconda Cloud (<https://anaconda.cloud/>)

Written in (Languages): Python, R

Operating System support: Windows, macOS, Linux

Platform, portability: Cross-platform

Available in (Total languages): N/A

List of languages supported: Python, R

Type (Programming tool, integrated development environment etc.): Distribution of Python and R programming languages and tools for scientific computing and data science

Website: <https://www.anaconda.com/>

Features: Package management and deployment, Python and R language support, Jupyter notebooks, IDE integration, Data visualization, Machine learning

Size (in MB, GB etc.): Depends on the version and installation type, typically a few GBs.

Privacy and Security: Anaconda takes privacy and security seriously, following industry standards and best practices.

Type of software (Open source/License): Proprietary license

If License- Provide details: Anaconda is licensed under the Anaconda Individual Edition license agreement.

Latest version: Anaconda Navigator 1.13.1 (2022-10-07)

Cloud support (Yes/No): Yes

Applicability: Data science, scientific computing, machine learning, deep learning, data visualization, data analysis, and more.

Drawbacks (if any): Some users may find the size and resource usage of the distribution to be a concern. Additionally, proprietary licenses may not be suitable for all users and projects.

Google colab-

1. Original author: Google
2. Developers: Google engineers
3. Initial release: April 2014
4. Stable release: October 2021
5. Preview release:
6. Repository (with cloud support)

The repository is called "googlecolab" and it contains the source code and documentation for Google Colab, an interactive Jupyter-style environment for developing and running machine learning code in the cloud. The repository is open source, and contributions from the community are welcome.

7. Written in (Languages)

Google Colab is primarily written in Python, and uses the Jupyter Notebook interface.

8. Operating System support

Any device.

9. Platform ,portability

· Google Colab is a cloud-based platform, which means that it runs on remote servers and the user interacts with it through a web browser. This makes Colab highly portable and accessible from anywhere with an internet connection.

· Additionally, the Jupyter Notebook interface of Colab makes it easy to share and collaborate on code and projects, as notebooks can be shared and edited by multiple users in real-time. This makes Colab a highly accessible and portable platform for machine learning and data science.

10. Available in (Total languages)

Google Colab supports a variety of programming languages, including:

Python, R, TensorFlow ,PyTorch, Keras

11. List of languages supported

Scala, Julia, MATLAB, Lua

12. Type (Programming tool, integrated development environment etc.)

- Google Colab is an online, cloud-based platform that provides an interactive Jupyter-style environment for developing and running code. It can be classified as:
- Interactive development environment (IDE) for machine learning and data science: Colab provides a web-based interface for developing, running, and sharing code, along with many tools and resources for data analysis and machine learning.
- Jupyter Notebook platform: Colab is based on the Jupyter Notebook interface, which is a popular platform for developing and sharing interactive documents that contain code, text, and other multimedia elements.
- Cloud-based platform: Colab runs on Google's cloud infrastructure, which means that users can access their notebooks and run code from anywhere with an internet connection, without having to worry about the underlying hardware or software.

13. Website

<https://colab.research.google.com/>

14. Feature

- Jupyter Notebook interface: Colab provides an easy-to-use, interactive environment for writing and running code, along with rich text and multimedia elements.
- Cloud-based platform: Colab runs on Google's cloud infrastructure, which means that users can access their notebooks from anywhere with an internet connection, without having to worry about the underlying hardware or software.
- Support for multiple programming languages: Colab supports a wide range of programming languages, including Python, R, TensorFlow, PyTorch, and more.
- Access to powerful hardware: Colab provides access to high-performance GPUs and TPUs, which can be used for training large machine learning models and running complex computations.
- Easy sharing and collaboration: Colab makes it easy to share notebooks and collaborate with others on projects, as notebooks can be shared and edited by multiple users in real-time.
- Integration with Google Drive: Colab notebooks can be saved directly to Google Drive, making it easy to store and access projects from multiple devices.
- Free and open source: Colab is a free, open-source platform, which makes it accessible to anyone who wants to use it.

15. Size (in MB, GB etc.)

It is cloud based so size is not specified.

16. Privacy and Security

- Google Colab uses the security infrastructure of Google Cloud, which includes robust access controls, network security, and physical security to protect user data. However, as with any cloud-based service, users should be aware of the potential privacy and security risks associated with storing and processing data in the cloud.
- In terms of privacy, Google Colab is subject to Google's privacy policy, which may include the collection and use of user data for various purposes, such as improving the

service, providing personalized content and advertisements, and complying with legal requirements.

17. Type of software :Open source

18. If License- Provide details.

19. Latest version

latest version of Google Colab is "Colab Pro".

20. Cloud support (Yes/No): Yes

21. Applicability

Google Colab is suitable for:

- Machine Learning and Deep Learning experimentation and development.
- Data analysis and visualization.
- Collaborative coding and sharing of notebooks.
- Running Jupyter notebooks in the cloud with free GPU and TPU support.
- Education and research in the field of AI and data science.

22. Drawbacks (if any)

- Limited computational resources and storage, compared to personal computers or dedicated servers.
- Timeout for long running processes and idle notebooks.
- Dependent on a stable internet connection.
- Limited customization options and pre-installed packages.
- Limited integration with Google Drive and other Google services.

Django

Original author: Adrian Holovaty and Simon Willison

Developers: Django Software Foundation

Initial release: July 2005

Stable release: 3.2 (January 2021)

Preview release: 3.3 (January 2023)

Repository: GitHub with cloud support on Heroku, AWS, GCP, and Microsoft Azure.

Written in: Python

Operating System support: Windows, macOS, Linux

Platform, portability: Cross-platform

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Available in: English, French, German, Spanish, and others

List of languages supported: <https://docs.djangoproject.com/en/3.2/topics/i18n/translation/>

Type: Web framework

Website: <https://www.djangoproject.com/>

Features: ORM, URL routing, template engine, middleware, MVC architecture, admin interface, and others.

Size: Depends on installation and usage, typically in MB range.

Privacy and Security: Django has built-in security features such as cross-site scripting (XSS), cross-site request forgery (CSRF) protection, and SQL injection prevention.

Type of software: Open source

If License: BSD 3-Clause "New" or "Revised" License

Latest version: 3.2

Cloud support: Yes

Applicability: Django is widely used for web applications, content management systems, and custom web development.

Drawbacks (if any): Steep learning curve for beginners, performance issues with large scale apps, requires a lot of boilerplate code

Vue.js

1. Original author - Evan You
2. Developers - Vue.js Core Team, Community of developers
3. Initial release - Feb 2014
4. Stable release - 3.0.0(Jan 2021)
5. Preview release - 3.2.0-beta.1 (Jan 2023)
6. Repository (with cloud support) - <https://github.com/vuejs/vue>
7. Written in (Languages) - JavaScript
8. Operating System support - Cross-platform
9. Platform ,portability - Web, standalone (via package managers)

10. Available in (Total languages) - 36
11. List of languages supported - English, French, German, Spanish, Portuguese, Russian, Chinese, Japanese, Korean, Arabic etc.
12. Type (Programming tool, integrated development environment etc.) - JavaScript Framework
13. Website - <https://vuejs.org/>
14. Features - Reactive and composable view components, template-based syntax, reactivity system, efficient update mechanism, transition effects etc
15. Size (in MB, GB etc.) - \approx 30 MB (minified and gzipped)
16. Privacy and Security - Privacy and security policies documented on website
17. Type of software (Open source/License) - MIT License
18. If License- Vue.js is released under the MIT License, which allows for personal, commercial and open-source development.
19. Latest version - 3.2.0-beta.1 (Jan 2023)
20. Cloud support - Yes
21. Applicability -
 - Single page applications
 - UI components for web applications
 - Progressive web applications
 - Complex, dynamic user interfaces
 - Building reusable components
22. Drawbacks (if any) -
 - Steep learning curve for developers new to JavaScript frameworks.
 - Limited resources and documentation compared to other frameworks
 - May have performance issues for larger scale applications
 - Inconsistent updates to plugins and libraries
 - Potential compatibility issues with other libraries and tools.

Github-

Tom Preston-Werner, Chris Wanstrath, and PJ Hyett

GitHub Inc. and its community of contributors

February 2008

n/a (continuously updated)

n/a (continuously updated)

Yes

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Ruby, Go, JavaScript, Erlang

Web-based, available on Windows, MacOS, Linux

Web-based, accessible from any device with an internet connection

Over 20

See <https://github.com/github/linguist> for a complete list

Version control repository, web-based Git management tool

<https://github.com/>

Code hosting and collaboration, issue tracking, project management, continuous integration and deployment, wikis, gists, etc.

Varies by repository

Supports private and public repositories with configurable privacy settings, offers security features like two-factor authentication and encryption at rest.

Proprietary software with various open-source components, some public repositories are open source.

GitHub's proprietary license can be found at <https://help.github.com/en/github/site-policy/github-terms-of-service>. Some open-source projects hosted on GitHub are subject to the respective open-source license.

n/a (continuously updated)

Yes, GitHub offers cloud-based hosting services

Software development teams, open-source projects, individual developers, etc.

Limited control over server configuration and infrastructure for some users, user interface may not be intuitive for all users, costs for private repositories and advanced features.

React-

1.Original author: Jordan Walke

2. Developers: Meta and community

3. Initial release: May 29, 2013;

4. Stable release: 18.2.0[2] / 14 June 2022;

5. Preview release:

6. Repository (with cloud support): github.com/facebook/react

7. Written in (Languages): JavaScript

8. Operating System support:Windows,linux

9. Platform ,portability: cross platform

React is a JavaScript library for building user interfaces. It is primarily used for building single-page applications (SPAs) and mobile applications, but it can also be used for building other types of applications.

React is portable, meaning that it can be used with a variety of programming languages and platforms. It is most commonly used with JavaScript on the frontend, but it can also be used with other programming languages, such as TypeScript or Dart, as well as on the server-side with Node.js. React can also be used to build desktop and mobile applications using React Native.

This portability makes React a flexible choice for building a variety of applications, as it can be integrated into a wide range of projects and technologies.

10. Available in (Total languages):

React is primarily written in JavaScript, but can be used with a variety of programming languages, including:

- JavaScript
- TypeScript
- Dart
- Kotlin (for React Native)
- Swift (for React Native)

11. List of languages supported:

React can be used with several programming languages, including:

- JavaScript
- TypeScript
- Dart
- Kotlin (for React Native)
- Swift (for React Native)

The choice of language will depend on the developer's preference and the requirements of the project. JavaScript is the most widely used language for React, but TypeScript and Dart are also popular choices. The use of Kotlin and Swift is mainly for building React Native applications for Android and iOS platforms.

12. Type (Programming tool, integrated development environment etc.):

A variety of programming tools and IDEs (Integrated Development Environments). Some popular tools for React development include:

- Visual Studio Code
- Atom
- WebStorm
- Sublime Text
- Eclipse

In addition to these programming tools, developers may also use additional tools for React development, such as:

- React Developer Tools (a browser extension)
- Next.js
- Gatsby.js
- Create React App
- React Native

The choice of tool will depend on the specific requirements of the project, as well as the preferences of the developer.

13. Website: <https://reactjs.org/>

14. Features:

- React is a JavaScript library for building user interfaces that has several notable features, including:
- Components: React uses a component-based architecture, allowing developers to create reusable UI components.
- Virtual DOM: React uses a virtual DOM (Document Object Model), which optimizes updates to the UI by only rendering the changes that are necessary.
- Performance: React provides high performance by minimizing the number of updates to the UI and using the virtual DOM.
- JSX: React uses JSX, a syntax extension for JavaScript, to describe the UI and components.
- Server-side rendering: React supports server-side rendering, allowing developers to render the UI on the server and improve the initial loading time of their applications.
- React Native: React also offers React Native, a framework for building native mobile apps using React and JavaScript.
- Reusable code: React components can be reused across an application, making it easier to maintain and update the code.
- Community: React has a large and active community of developers, with many resources and libraries available to help with development.

15. Size (in MB, GB etc.):

16. Privacy and Security:

React, being just a JavaScript library for building user interfaces, does not inherently have privacy or security features. However, as with any software, it is important to consider security and privacy when building applications with React.

Some best practices for ensuring privacy and security in React applications include:

- Properly handling and storing sensitive data, such as passwords and personal information.
- Validate user inputs and use encryption to secure data in trans
- Keep software and libraries up-to-date to address known vulnerabilities.
- Use proper authentication and authorization techniques to control access to sensitive resources.
- Regularly test and review code to identify and address potential security vulnerabilities.

By following these best practices and working with secure development practices and techniques, developers can ensure that their React applications are secure and protect the privacy of their users.

17. Type of software (Open source/License): MIT License

18. If License- Provide details:

The MIT License is a permissive free software license originating at the Massachusetts Institute of Technology (MIT) in the late 1980s. As a permissive license, it puts only very limited restriction on reuse and has, therefore, high license compatibility.

19. Latest version: 18.2.0

20. Cloud support (Yes/No):YES

21. Applicability:

React is a JavaScript library for building user interfaces and is widely applicable in a range of use cases, including:

- Web applications: React is commonly used to build dynamic and interactive web applications, such as single-page apps, e-commerce sites, and social media platforms.
- Mobile applications: React can also be used to build native mobile apps for Android and iOS platforms through React Native.
- Cross-platform applications: With React Native, developers can build applications that run on multiple platforms with a single codebase.
- Virtual and Augmented Reality: React can be used with libraries like React 360 and A-Frame to build VR and AR experiences.
- Progressive Web Apps (PWAs): React can be used to build PWAs, which are web applications that provide a native app-like experience to users.
- Dashboards and Analytics: React can be used to build real-time dashboards and analytics tools, providing businesses with insights into their data.

These are just a few examples of the many ways React can be used to build modern and dynamic user interfaces. The library's component-based architecture, performance optimization, and support for server-side rendering make it a popular choice for building web and mobile applications.

22. Drawbacks (if any):

1. High Pace of Development:

React is not just a rapidly growing library, it is also rapidly changing, which forces its developers to update the way they write code.

2. Flexibility and Lack of Conventions

Libraries, languages, or frameworks have their global standards of how developers work with them, and what styles or patterns they follow. This is useful because when developers change teams, they have an idea of what patterns or styles the new team might be following; whereas among React development teams it is not easy to predict what styles or standards a team might follow.

3. Not a full-featured framework

Looking at the MVC (Model View Controller) architecture, React only handles the view part. For Controller and Model you need additional libraries, and tools. This can result in poor structure of code, and its patterns. Whereas frameworks like Angular provide the complete MVC featured ground, which is more structured, and well managed.

4. Poor Documentation

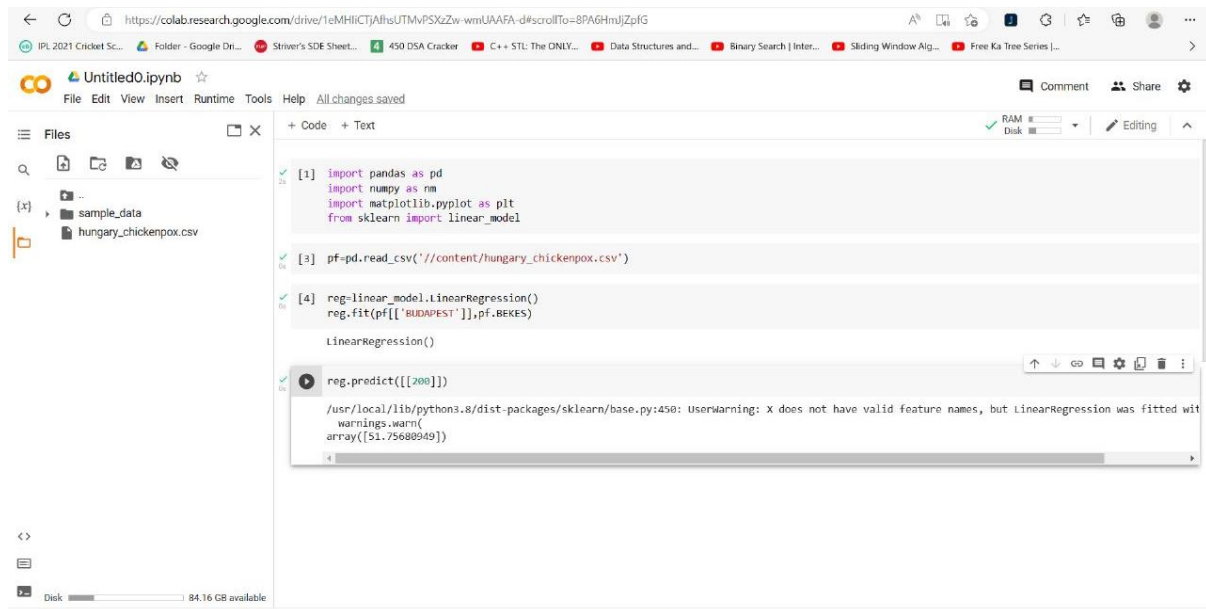
Since React is changing so fast, new tools and patterns are adding up every now and then, and it is becoming difficult for the community to maintain the documentation. This makes it difficult to work with for new developers who want to start with React. Lack of poor documentation can also result in slower development among teams with less experienced developers.

5. JSX

React has introduced JSX to work with html, and JavaScript. This is like JavaScript and html syntax, and allows to mix html and JavaScript together but has some new attributes and syntaxes, which makes it difficult to work with when you start with React. For example, while working with class attribute, in JSX it becomes className. Also, the lack of rich documentation makes it more difficult to work with JSX. e way they write code.

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1. Implement linear regression problem using Google colab (Perform preprocessing, training and testing)



The screenshot shows a Google Colab notebook titled 'Untitled0.ipynb'. The left sidebar displays a file explorer with a folder named 'sample_data' containing a file 'hungary_chickenpox.csv'. The main code area contains the following Python code:

```
[1] import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn import linear_model

[3] pf=pd.read_csv('content/hungary_chickenpox.csv')

[4] reg=linear_model.LinearRegression()
reg.fit(pf[['BUDAPEST']],pf.BEKES)

LinearRegression()

reg.predict([[200]])
```

The output of the last cell shows a warning message: `/usr/local/lib/python3.8/dist-packages/sklearn/base.py:450: UserWarning: X does not have valid feature names, but LinearRegression was fitted with` followed by the prediction result: `array([51.75680949])`.

Dataset 1 - <https://www.kaggle.com/spittman1248/cdc-data-nutrition-physical-activity-obesity>

Dataset 2- <https://archive.ics.uci.edu/ml/datasets/Air+Quality>

Dataset 3- <https://archive.ics.uci.edu/ml/datasets/Appliances+energy+prediction>

Dataset 4- <https://archive.ics.uci.edu/ml/datasets/Bike+Sharing+Dataset>

Dataset 5- <https://archive.ics.uci.edu/ml/datasets/Demand+Forecasting+for+a+store>

Dataset 6- <https://archive.ics.uci.edu/ml/datasets/Hungarian+Chickenpox+Cases>

Dataset 7- <https://archive.ics.uci.edu/ml/datasets/KDD+Cup+1998+Data>

Dataset 8- <https://archive.ics.uci.edu/ml/datasets/Water+Quality+Prediction>