SOFTWARE FOR DIGITAL DEVELOPMENT MODULE

(CIS4044-N-BF1-2022)

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PROJECT:

CRITICAL EVALUATION OF SOFTWARE FOR DIGITAL INNOVATION



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# Introduction

This essential report will critically identify the pros and cons of this course's various software tools and libraries. It will aim to be as objective as possible and leave out a personal preference to increase the report's validity.

Data is the new Fortier holding endless and vast resources to solving some of the world's most complex problems. With the world's data quadrupling yearly, it is easy to say that several solutions would come from this. Because man has found a way to eliminate their bias by using high-end supercomputers and simple codes that would help solve day-to-day problems quickly and efficiently. The primary driver of this venture would be the tech world, amongst which are the Data Scientists and Data Engineers, the ones tasked with seeking and making sense of this rangled forest of endless information. As for Data, the main aim is its integrity and its security. Due to the potency of Data and the result it seeks to answer in the coming years, companies and custodians of Data must do so with the knowledge that integrity and security are essential in this industry. Thus Data scientists are supposed to know about the various tools and their levels of threats.

## **Integrated Development Environment**

### ***Jupyter Notebook***

It is one of the fast-rising IDE of our time. Its emergence occurred with Tech roles. It was designed for code, data resources and a notebook. Because of its flexibility, it is well used for the easy workflow in many computing fields. It is one of the simplest IDEs to use for projects.

#### **Limitations of Jupyter notebook**

1. It uses a kernel, which must be restated from time to time, which is incredibly stressful and time-consuming.
2. Running Unittesting on codes is complex
3. There is downtime when it tends to process burdensome code.

#### **Security breaches of Jupyter notebook**

1. Due to the running principle of the Jupyter notebook, it is relatively safe as it runs locally on the web browser accessed by the machine in question.

### ***Visual Studio Code***

Visual studio code, or Vs code as it is more commonly known, is a fast, versatile tool used by Data scientists and Software Engineers. It can run several languages, and most importantly, in our case, python. C, C++, Java, PHP, and SQL can be used with other languages. Vs code is an accommodating IDE as it also allows the use of several OS from Mac to Windows to Linux. Because of its versatility, it offers a range of online support and technical skills.

#### **Limitations of Visual Studio Code**

1. Vs code interface is not necessary for Data Scientists as it does not help tackle data analysis in a specific way.
2. Vs code is very vast, and one will need some form of guidance to setup for starters
3. It requires a level of expertise to get modules running on Vs code
4. Vs code does not offer a straight part to Debugging as it may not be High light the position of the various errors.

#### **Security breaches of Visual Studio Code**

1. Vs code operates through remote access, and hackers can explore this through the use of viruses or malware which would, in turn, steal the users details or cause significant damage,
2. Through the years, Vs code has had one primary source of security threat from plugins. These plugins and extension servers as a means of an external attack on software engineers, as this breach grants access to the user through extensions and plugins, which is very hazardous.

# Software Libraries

### ***Pandas***

Pandas is a python library used primarily for processing and analyzing data used for visualization and professional insights by Data scientists and Data Engineers.

#### **Limitations of Pandas**

1. The panda library documentation is not the usual Python syntax, making it difficult to follow. Pandas also find it hard to work with 3D matrices hence the need to use them along sing other libraries like Numpy.

#### **Security breaches of Pandas**

1. Pandas library is generally considered secure.

### ***Matplotlib***

Matplotlib is a python library with a comprehensive database for creating static and animated visualization.

#### **Limitations of Matplotlib**

1. A date function is necessary for processing date imports—a minor setback, in any case.
2. It only plots 2D graphs

#### **Security breaches of Matplotlibs**

1. Matplotlib library is secure

### ***Requests***

Requests is a popular, simple python library that gets info from API calls and API interactions. This is one of the most used libraries used in fetching and sending data. It is usually not included in python and would need to be downloaded.

#### **Limitations of Requests**

1. The package needs to be downloaded before use.
2. HTML parser can not be used alongside

#### **Security breaches Requests**

1. Requests can be made into a hacking site by creating harmful APIs that can lead to Malware malfunction.

### ***Tkinter***

This is a library in python used to build Graphic user interfaces. It is made for Python code. It is not a library that needs to be installed as it comes in a primary mode. It is an excellent visualization tool and offers various options for designing a good dashboard.

#### **Limitations of Tkinter**

The most probable limitation would be based on speed, as interfaces made with multilayers would cause there to be a delay in the processing time.

### ***Unittest***

Unittest is simply an implementation in python that uses the appropriate modules or packages to certify the integrity of the code in concern. This can be termed as the quality assurance section of any program that has been built. A series of test sequences usually compress it to validate the actual code outcome.

**Limitation of Unittest**

1. Unittesting syntax differs depending on the code in question
2. A compilation with the use of instances and functions.

# References

Singhal, V., 2021. *Advantages and Disadvantages of Jupyter lab.* [Online]   
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# Appendix

Black Box

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Number | Process | Input | Expected out | Actual Out | Pass/Fail |
| G001 | Initialize GUI | Run the code GUI ICA.ipynb from Jupyter lab | Graphics User interface should come up | Graphics User interface ran | Pass |
| G002 | Test GUI file | 1. Run GUI code 2. Click on the Police report button | Details of the police report should printout in text area and graph should appear in the Jupyter Lab | Details of the police report printed out in text area and the graph appear in Jupyter Lab | Pass |
| G003 | Test GUI file | 1. Run GUI code 2. Click on the Covid 19 report button | Data analysis of the various Covid 19 cases should generate in Jupyter lab | Data analysis of the various Covid 19 cases were generated in the Jupyter lab | Pass |
| G004 | Test GUI file without internet connection | 1. Run GUI code 2. Click on the Police report button | Code should prompt an error as it is not connected to the web, | Code give an error message of : **urllib.error.URLError: <urlopen error [Errno 11001] getaddrinfo failed> as it is not connected to the web** | Pass |
| G005 | Test GUI file without access to the source folder | 1. Run GUI code 2. Click on the Covid 19 report button | Code should prompt an error as the source folder does contain the require file, | Code give an error stating “No file with that name in this directory” | Pass |