**Programming Language Research Project**

**Phase 1**

Nouraldin Hassan

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# Introduction

This assignment is in reference to the Course Section Information and the assignment tasks.  
For the Language Research task, three chosen websites are to be briefly described and documented in this file, followed by determining the credibility of the site.  
For the Language Selection Task, a programming language is to be chosen and is to be described in a way that reasons with the assignee’s career goals.  
For the Unit Testing Research task, two websites are to be found that contain details about framework-based unit testing as part of the chosen programming language, as well as describing the websites and documenting them. Any given unit test framework may be used if there are more than one, though non-free unit test frameworks are to simply be documented and proof is to be provided in the form of referenced resources. In later assessments, writing one’s own test code without a framework may be required, providing references to sources that detail the lack of unit-testing framework per writing of the program.  
For the Development Tools – including platform, tool availability and licensing – Providing the exact operating system, programming language and IDE is to be done for the course, with detail that includes the latest version or build number for each OS, IDE, and Programming Language. Screenshots are acceptable and may be provided in this file. It is recommended that free tools and resources are used.  
For the WBS and Gantt Chart, the handouts provided alongside this file are to be reviewed, followed by creating a brief work breakdown structure in order to decompose the practical project tasks into sub-tasks. A Gantt chart is to also be created based on the WBS with details given in the unmodified Research Assignment file. A screenshot of the Gantt Chart is to be added in this file afterwards. Finally, the Gantt Chart is to be submitted alongside this file.

All documentation is in IEEE format.

# Language Research

The following websites have been decided upon for language research:

1. <https://www.tiobe.com/tiobe-index/>. ([TIOBE Index - TIOBE via archive.org](https://web.archive.org/web/20240911175724/https:/www.tiobe.com/tiobe-index/))­­[1]
2. <https://spectrum.ieee.org/top-programming-languages-2024>. [2]
3. <https://www.hackerrank.com/blog/most-popular-languages-2024/>. [3]

TIOBE is a software company that assesses software quality and creates code and program assessment products and is well known for the creation of the TIOBE Index. IEEE Spectrum is a blog site from IEEE itself that provides articles related to science and technology. HackerRank is a company that assists companies with developing programming teams to improve their skills.

The C.R.A.A.P Test is used below for determining website credibility and reputation.

* The TIOBE Index was first published more than 20 years ago to display and indicate the most popular programming languages at the time.
  + Since then, the index gets updated at least every month.
  + TIOBE remains relevant in the industry due to its worldwide reach, where the people that mainly look at the index are software developers and programmers.
  + Paul Jansen, the author of the index, is a university graduate of computer science cum laude and philosophy cum laude, who had previously worked at Atos Origin and has then founded TIOBE in 2000. Paul Jansen has a LinkedIn account where he can be connected to and may be contactable there.
  + The information comes from the use of popular web sites from popular search engines via web scraping, data storing, and automation to calculate the ratings for each particular programming language. There are some people who disbelieve of the TIOBE Index being truthful, such as a YouTube channel named “ThePrimeTime” who made a 25-minute video called “TIOBE INDEX LIES!”.
  + The purpose of the index is, according to them, to “check whether your programming skills are still up to date”, as well as “to make a strategic decision about what programming language should be adopted when starting to build a new software system”[1]. The author of this file personally does not find much bias, since the list is maintained primarily by automation and algorithms, with additional maintenance by programmers on a monthly basis.

TIOBE has “.com” in the URL, which makes it strike 1 in the strike-system credibility checklist. Other than that, it succeeds in the 2-strike and 3-strike credibility checklist and CRAAP test.

* IEEE Spectrum’s List of Top Programming Languages of 2024 was published in August 22, 2024.
  + The relevancy, accuracy and purpose is close to being the same as the TIOBE Index, but with changes in calculation and/or is either more or less frequently updated. Two particular differences are that the list is ordered differently and that a decimal-like system is involved, and there are two options to sort the list by “Trending” and “Jobs” for those that like to see programming language popularity and to see which languages are used in jobs the most. Stephen Cass is a special projects editor and is responsible for the Top Programming Languages project. Cass has attained a bachelor's degree in experimental physics.

IEEE Spectrum is from the IEEE organization, an official and well-known institution. It succeeds in the 2-strike and 3-strike credibility checklist and CRAAP test.

* HackerRank’s Blog of the Most Popular Programming Languages of 2024 was published in May 6, 2024.
  + Given that it’s organized into a blog post and not an automated list, current information is required in order for the post to be relevant and to be manually updated with the most up-to-date information.
  + The relevance and purpose is close to being the same as the TIOBE Index, but ordered slightly differently due to information documenting differences.
  + Nicole Littlejohn is a freelance Content Writer that has authored multiple HackerRank blog posts and also works with other business owners and entrepreneurs worldwide on writing content for people [4].

HackerRank has “.com” in the URL, which makes it strike 1 in the strike-system credibility checklist. Other than that, it succeeds in the 2-strike and 3-strike credibility checklist and the CRAAP test.

# Language Selection

It has been decided upon to use C# as a programming language to study, due to the author of this file having previous experience with it and the language having a few typography and syntax similarities. C# can be used for creating programs that could be made in Java, and also developing video games and video game modifications as both a hobby and a job interest.

# Unit Testing Research

The following websites have been decided upon for unit testing research:

1. <https://dev.to/bytehide/unit-testing-with-c-and-net-full-guide-5c7p>. [5]
2. <https://learn.microsoft.com/en-us/dotnet/core/testing/unit-testing-with-nunit>. [6]

Dev.to, known as DEV Community, is an online platform for software developers and organizations where articles and posts can be shared.

Microsoft Learn is a self-directed learning platform for helping people develop technical skills and learn how to use Microsoft and Microsoft-sponsored and approved software.

The C.R.A.A.P Test is used below for determining website credibility and reputation.

* The DEV Community site was first launched in 2016 and created using Ruby on Rails.
  + The post itself was made on June 2, 2023 and was originally published on bytehide.com [5]. Given that it was written manually, the information may be outdated if it does not get updated again alongside or to support the latest C# and .NET changes.
  + The information relates to C# developers that intend to test their software projects, as well as the language that the author of this file has decided upon studying.
  + ByteHide is a security platform that provides automated protection for software projects and applications, such as source code protection from de-compilation or reverse-engineering. Juan Alberto España Garcia, CEO, has been affiliated with Factorial HR, Prockett, and Azigrene Consultores. His profile can be found on LinkedIn [7].
  + Multiple options of testing frameworks and tools are present in the page, that being xUnit, NUnit, MSTest and Moq, but only xUnit and Moq are explainined due to prevalence among developers. There doesn’t appear to be bias or emotional tone.
  + The page explains two options of testing frameworks and how to utilize them rather than just one framework.

Dev.to is a popular coding-oriented community site. The page itself succeeds in the 2-strike and 3-strike credibility checklist and CRAAP test.

* Microsoft Learn was released on September of 2018 and provides self-learning resources on Microsoft software and technologies.
  + The page itself was written manually and will need to be updated to match the new version of unit testing frameworks for C#.
  + The page can be contributed to by GitHub users, which makes it difficult to find the original author.
  + The information is expected to be accurate given how big Microsoft is, in order to retain as much credibility as possible.
  + The purpose of the page is to provide simple instructions to follow along on how to set up NUnit, the testing framework mentioned there.

Microsoft Learn has “.com” in the URL, which makes it strike 1 in the strike-system credibility checklist. Other than that, it succeeds in the 2-strike and 3-strike credibility checklist and the CRAAP test.

The author of this file has decided upon using xUnit for their programming language research project, due to it being modern, extensible, and has a focus on simplicity and ease of use [5].

# Development Tools

The following, including operating system, will be used:

* Windows 11 Home (Version 23H2, Build 22631.4169)
* .NET 8.0 (Version 8.0.8)
* C# (Version 12.0, Build 4.11.0-3.24428.4~)
* xUnit (Version 2.9.0)
* Visual Studio 2022 Community (Version 17.11.3)

# WBS and Gantt Chart

1. Phase 1: Project Initialization
   1. Research, Learning
      1. Creating a Simple Program
      2. Language Basics: Syntax
      3. Language Coding Style
      4. Language Commenting Style
   2. Development, Learning
      1. Creating a Simple Program Based on Provided Data Set
   3. Testing
      1. Verifying Program Output Meets Expectations
   4. Documentation
      1. Program Comments
      2. Screenshots of Program Running
      3. Writing MS Word Document
   5. Delivery
      1. Submission of Practical Project Phase 1

A screenshot of a computer

Description automatically generated

# References

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