

**Project Definition Document**

**(make nicer before submitting)**

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# **Introduction**

The purpose of this Project Definition Document is to provide a brief overview of what my Final Year Project will entail and the direction in which I intend to take in the development of this project.

My Final Year Project (FYP) will be a project containing a collection of functional human-machine interface (HMI) panels, with each panel displaying some different feature or functionality that “FactoryTalk Optix” from Rockwell Automation [1] has to offer. This software is to be released by the end of 2022 and rolled out within Medtronic upon release, replacing their current software **(ask for name from MM)**. Therefore, it is necessary for the relevant personnel within Medtronic to get a grasp of the capability of this new software prior to the full-scale release.

# **Tools and Software Used**

*C#*

Figure - C# logo

*Icon

Description automatically generated*C# (pronounced C-sharp) is a multi-paradigm high-level programming language. It encompasses static typing, lexically scoped, strong typing, declarative, imperative, object-oriented, functional, generic and component-based programming disciplines. [2]

The language was designed in 2000 by Anders Hejilsberg from Microsoft and it was approved as an international standard by ECMA in 2002 and ISO/IEC in 2003. [2]

FactoryTalk Optix allows the use of C# scripts to provide additional functionality to projects by allowing development of customised runtime and design time logics. These scripts can be used to create a responsive user interface [3].

*Git / GitHub*

Git is a free and open-source distributed version control system which keeps track of any changes to files in a project. It can handle all sizes of projects without compromising speed or efficiency. Git was authored by Linus Torvalds in 2005 and has been updated continuously ever since. [4]

A picture containing text

Description automatically generatedMeanwhile, GitHub is (as of writing this) the most popular internet hosting service for version control and software development using Git. The company was founded in 2008 as ‘Logical Awesome LLC’. It provides all the features that Git has to offer but also includes additional features for its users such as bug tracking, access control, software features requests, task management, wikis for every project and continuous integration. [5]

Figure - GitHub logo

I will be using GitHub for version control for this project. I will have two repositories, one for the FactoryTalk Studio project and one for the automated tests. Regular commits to both repositories will ensure if any issues arise, I will be able to revert back to a previous working commit, narrow down on what’s causing the issue and fix it.

*FactoryTalk Optix*

FactoryTalk Optix is a new product from Rockwell Automation. It is a cloud-enabled software that allows users to design, test and deploy human-machine interface applications from a desktop editor or web browser. As of writing this, FactoryTalk Optix is not yet available to the public. [6]

The bulk of my project will be conducted using FactoryTalk Optix. I will be using it to design all of the panels that will showcase the different functions and features FactoryTalk Optix has to offer.

*Uniqo*

A picture containing logo

Description automatically generatedUniqo is the predecessor to FactoryTalk Optix which was developed by Asem Automation (owned by Rockwell Automation) [7].

Figure - Uniqo logo

I will be using this software alongside FactoryTalk Optix to conduct research. Both software are still quite similar in functionality, but all sample projects provided in the documentation are Uniqo projects which are not compatible with FactoryTalk Optix. To help my understanding of the features FactoryTalk Optix has to offer, I will be required to open the provided sample projects in Uniqo.

*Visual Studio 2022*

Visual Studio 2022 is a free, extensible and fully featured IDE that allows users to create applications for various platforms such as Windows, iOS and Android as well as cloud services and web applications [8]. It is the latest version of Visual Studio released by Microsoft.

Visual Studio 2022 is my IDE of choice to write and develop the unit tests for the project. I chose this IDE as I have experience using this IDE throughout my 3rd year placement, therefore I am familiar with it and the features it has to offer to its users.

*StringTemplate 4*

StringTemplate 4 is a java template engine which is used to generate source code, emails, web pages or any other sort of formatted text output. As stated, it is a java template engine, but it has ports to C#. [9]

I will be utilising StringTemplate 4 for auto-generation of the panels that I will be creating in FactoryTalk Optix. The panels are created using only yaml files, making them ideal to be generated using a template engine such as StringTemplate 4.

*Selenium WebDriver*

Selenium WebDriver is a web framework that allows users to create cross-browser tests. These tests are then used to verify that a web-based application performs expectedly. [10]

FactoryTalk Optix allows for the deployment of projects through a web browser, making it ideal for automated testing. I can open the project and deploy it to a web browser from which I can then run the tests and they will perform tests on my project automatically.

Logo, company name

Description automatically generated*Specflow*

Specflow allows users to manage, define and execute automated tests on applications as business readable specifications. It is designed to bridge the gap in understanding between the developers and business users. It is a part of the Cucumber ecosystem and is based on Gherkin [11].

Figure - Specflow logo

I will be using Specflow to define my tests as ‘scenarios’, which are made up of a series of short and logical steps, which can be easily read and understood by anyone, whether they have a background in software development or not.

# **Project Deliverables**

|  |  |
| --- | --- |
| **Deliverable** | **Date** |
| Project Definition Document | 5th November 2022 |
| Project Report | **GET DATE** |
| Project Demonstration | **GET DATE** |

# **Project Timeline**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task ID** | **Task** | **Estimated Time in Hours** | **Dependencies** |  |  |
| T1 | Download necessary technologies | 4h | None |  |  |
|  |  |  |  |  |  |
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# **References**

[1] Information on FactoryTalk Optix - [FactoryTalk Optix | FactoryTalk (rockwellautomation.com)](https://www.rockwellautomation.com/en-us/products/software/factorytalk/optix.html)

[2] Information on C# - [C Sharp (programming language) - Wikipedia](https://en.wikipedia.org/wiki/C_Sharp_(programming_language))

[3] Information on NetLogic - [NetLogic (asem.it)](https://uniqo.asem.it/help/en/csharp/netlogic/Index.html)

[4] Information on Git - [Git (git-scm.com)](https://git-scm.com/)

[5] Information on GitHub - [GitHub - Wikipedia](https://en.wikipedia.org/wiki/GitHub#:~:text=It%20is%20commonly%20used%20to,host%20as%20of%20November%202021.)

[6] Information on FactoryTalk Optix - [Rockwell Automation Speeds Time to Market for New Industrial Automation Design, Launches FactoryTalk Design Hub | Business Wire](https://www.businesswire.com/news/home/20221013005225/en/Rockwell-Automation-Speeds-Time-to-Market-for-New-Industrial-Automation-Design-Launches-FactoryTalk-Design-Hub)

[7] Information on Uniqo - [UNIQO Application Software - ASEM S.r.l. con Socio Unico (asemautomation.com)](https://www.asemautomation.com/en/products/242/uniqo.html)

[8] Information on Visual Studio 2022 - [Visual Studio 2022 Community Edition – Download Latest Free Version (microsoft.com)](https://visualstudio.microsoft.com/vs/community/#:~:text=A%20fully%2Dfeatured%2C%20extensible%2C,Download%20Visual%20Studio)

[9] Information on StringTemplate 4 - [StringTemplate](https://www.stringtemplate.org/)

[10] Information on Selenium WebDriver - [Selenium Webdriver Tutorial with Examples | BrowserStack](https://www.browserstack.com/guide/selenium-webdriver-tutorial#:~:text=in%20Selenium%204%3F-,What%20is%20Selenium%20WebDriver%3F,language%20to%20create%20test%20scripts.)

[11] Information on Specflow - [SpecFlowWiki/FAQ.md at master · SpecFlowOSS/SpecFlowWiki (github.com)](https://github.com/SpecFlowOSS/SpecFlowWiki/blob/master/FAQ.md)