

THE UNIVERSITY OF NEWCASTLE
SCHOOL OF INFORMATION AND PHYSICAL SCIENCES



COMPSci AND INFOTech WORK INTEGRATED LEARNING
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Project Plan

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FrontRunner – Improving Workflow Efficiency through Software

Background

The *Questas Group* is an Australia-wide conglomerate of over a dozen companies. The group spans a variety of fields including fabrication, irrigation and mechanical engineering, although their primary focus is on hydraulic repair. Among their largest child companies is *Berendsen Fluid Power*, Australia's largest locally owned hydraulics company which currently operates 11 branches nationally.

With so many companies to consider, and with more being continually added, managing their day-to-day processes in an efficient manner is increasingly vital – and increasingly difficult. Within *Berendsen*, each branch would gravitate towards operating “their way”, workflows based only on what seemed to work best at the time. The end result is that, while successful, the company would be inefficient at best. The answer to this is *FrontRunner*: a nascent but expanding collection of applications and management tools.

While a *Berendsen* initiative, *FrontRunner* is slowly being integrated into other areas of *Questas* under the approval of group CEO James Leach. Currently it is used to manage operational workflows, organize active and historical jobs, link these jobs to the sales team, store files and photos while linking them to jobs, generate timely reports, and so forth. Automation is the key here – by cutting more the mindless repetitive tasks out of the workday, employees will be able to power through more and more jobs. Crucially, *FrontRunner* will not replace anyone – it will allow companies to handle more jobs, increasing overall revenue.

Of all the companies under *Questas*, *Berendsen Fluid Power* has benefited most from *FrontRunner*. Within a few short years and across the 8 *Berendsen* branches that use it extensively, *FrontRunner's Cylinder Service* application has greatly streamlined the company's primary workflow. The paperwork management that once wasted upwards of 30 minutes per job has been reduced to a matter of seconds. This has saved thousands of hours and hundreds of thousands of dollars.

As *FrontRunner* is in its early stages and is being developed by a team of 2, it is still underutilized. Only 2 *Questas* companies currently use it to a meaningful degree. It has significant room to grow, ideally reaching into all companies under *Questas* and further enhancing their success. The following project has been developed to facilitate this growth.

Aims

The purpose of this project is to expand *FrontRunner*, helping to bring more companies into the software fold and allowing for customer-based demonstrations. The project can be divided into two parts, each taking place over 100 hours.

As part one, Perth-based company *Hardchrome Sales* wants *FrontRunner* capabilities as soon as possible. Workflow processes, and customer/employee management applications will be completed by the rest of the team. This part of the project will cover the applications that govern labour management. The applications let users create, save, update and submit timesheets, and let appropriate supervisors review, update and approve existing timesheets. Timesheet data will be displayed in a separate labour utilisation report app, consisting of multiple reports that show data based on a variety of useful parameters. Lastly, there will be a daily process that checks if any employees failed to start a timesheet in the previous **working** day, or if there are any incomplete timesheets that employees have started but not submitted. This will be completed over the course of COMP3851A.

Part two consists of an application allowing *Berendsen* sales representatives to demonstrate the cylinder service process to customers. The application will be similar to the existing *Cylinder Service* app but with a few key differences. It must provide enough functionality to be useful without overloading customers with information – it will be presented to clients with varying degrees of knowledge. It must be detached from existing *Berendsen* data, preventing leaks of data about previous clients. Finally, it must be able to automatically send alerts to the user, informing them of how the current “service” is progressing. This will be completed over the course of COMP3851B.

In summary, the deliverables of these two parts are:

1. **Hardchrome Sales**

- Timesheet app: Fill, save, update and submit timesheets.
- Timesheet management app: Review, update and approve users' timesheets.
- Labour reports app: Return labour data reports, including summaries.
- Process to check for timesheets: Find users who have not started or submitted timesheets.

2. **Cylinder Service Demonstration App**

- Service Demonstration app: Create a lightweight cylinder service workflow, updated to be more convenient for product demonstrations.

Methods and Activities

The existing *FrontRunner* infrastructure uses a custom-built IDE to help the developer build applications and other modules. Using the IDE, developers can create user-facing applications (**web interfaces**), automated data flows (**processes**) and MongoDB **collections** for storing data.

When building a **web interface**, sections of a webpage that were pre-fabricated before the start of the project, known as “widgets”, are defined and arranged by the developer. These widgets include basic elements like text or date input fields, buttons and HTML-based <div> blocks. If the developer needs something more complex than an input field or button, can also define more complex “custom widgets”, like complete browser-based modals.

The main advantage to using the IDE for applications is that repeated and simplistic elements of a webpage are streamlined. The developer can take their focus away from navigating the idiosyncrasies of CSS and re-building basic HTML forms, allowing them to concentrate on the more complex and dynamic functions of the application. In short, the developer can focus less on how it looks, more on what it does.

The developer can also define **processes** – in this case, automated data flows that accept a series of input parameters. Processes can generate emails and reports, and update collections. They can also be set to a timer, making them ideal for timed (i.e. daily/weekly/monthly) reports and alerts. They use Freemarker, a flexible template language designed for Java servlets. Freemarker works like Java or JS in practice, making it ideal for developers with knowledge of either language.

Any data captured by a web interface or process can be saved to a collection. In MongoDB, these data entries are stored as BSON and are known as “documents”. Collections use JSON objects to get, aggregate, save, update and remove data, and to define options.

The IDE will be used to develop the interfaces of the *Timesheet*, *Timesheet Management*, *Labour Reports* and *Cylinder Service Demonstration* apps, and the processes of the *Check Previous Timesheets* and *Cylinder Service Demonstration* apps. Successfully completing the aims of the project will require the following knowledge:

- How to navigate and use the IDE,
- JS/jQuery to create functionality for each widget, such as execute/submit functions for buttons, page initialisations, calculations and more,
- HTML to build printable reports, small sections like help/info/error bars, and so forth,
- CSS for style printable reports and other custom layouts,
- JSON to easily manage and store data – MongoDB uses JSON to store data in

collections,

- Freemarker to create process-specific functionality,
- Markdown to build templates of common HTML pages.

Due to the nature of these applications, proper and thorough testing will be imperative. The timesheet and labour-based applications will be the primary means of capturing labour utilisation and cost. The data captured and displayed there will influence the strategic plans of *Hardchrome Sales* – errors and incorrect outputs cannot be tolerated. Similarly, the demonstration application for part 2 will be one of the first public-facing application developed for *FrontRunner*. Any errors suggest a lack of competence, reflecting poorly on *FrontRunner* and potentially *Questas* as a whole.

#	Task	Start	Effort	6/4/22	13/4/22	20/4/22	27/4/22	4/5/22	11/5/22	18/5/22	25/5/22	1/6/22	8/6/22	15/6/22	22/6/22
1	Timesheet	6/04/2022	16h												
2	Timesheet Management	20/04/2022	16h												
3	Timesheet Data verification and testing	4/05/2022	8h												
4	Labour Reports	11/05/2022	16h												
5	Labour Report verification and testing	25/05/2022	8h												
6	Previous Timesheets Report	1/06/2022	8h												
7	Previous Timesheets verification and testing	8/06/2022	8h												
8	Final testing and deployment	15/06/2022	16h												

Figure 1. Gantt Chart for Part 1

#	Task	Start	Effort	20/6/22	27/6/22	4/7/22	11/7/22	18/7/22	25/7/22	1/8/22	8/8/22	15/8/22	22/8/22	29/8/22	5/9/22	12/9/22	19/9/22
1	Raise job	20/06/2022	4h														
2	Strip report	20/06/2022	12h														
3	Workscope /Estimation	4/07/2022	8h														
4	Formal quote	11/07/2022	8h														
5	Process to date + email quote to user	18/07/2022	8h														
6	Work instructions and requisitions	25/07/2022	8h														
7	Work on Job	1/08/2022	8h														
8	Process to date + alert workshop about job	8/08/2022	8h														
9	Pre-Assembly/Assembly	15/08/2022	8h														
11	Paint/QA/Testing	22/08/2022	8h														
12	Process to date + alert about finished job	29/08/2022	8h														
13	End-to-end testing and deployment	5/09/2022	24h														

Figure 2. Gantt Chart for Part 2

Ethics, intellectual property and confidentiality considerations

No ethical considerations are required for this project. The first part is only employees of *Hardchrome Sales*, helping workers to complete their tasks and supervisors to manage with greater efficiency. It is otherwise entirely focussed on the professional environment. This especially applies to the second part, as it is intended as a public-facing application – maintaining an impartial professional tone is key.

The only possible concern with either part is that, as the apps are entirely visually-directed, we have not considered the vision-impaired.

The preservation of intellectual property and customer confidentiality is a much greater concern. On completion of the project, some very sensitive data will be stored. This includes personal employee details – most crucially their “prime cost”. Prime cost is a measure of how much it costs the business for an employee’s labour per hour. Knowing the prime cost of an employee will allow anyone a very accurate estimation of how much they earn. Tightly controlling who has access to what data will be a vital part of this project.

Since we also store customer data, controlling who has access to that is equally important. This is why we must be careful building the *Cylinder Service Demonstration* app – knowing the purchasing details of their competitors can give some companies an unfair advantage.