Software Requirements Specification

for

Lab 1

Contents

[Functional Requirements 3](#_Toc176902179)

[Operator Interface 3](#_Toc176902180)

[Runner Interface 4](#_Toc176902181)

[Job Creation and Allocation 5](#_Toc176902182)

[Non-Functional Requirements 6](#_Toc176902183)

[Data Dictionary 8](#_Toc176902184)

# Functional Requirements

## Operator Interface

1. Operator shall be able to **login to the system** by inputting a unique username and password.
   1. If the password is invalid, System shall prompt the Operator until a valid password is inputted.
   2. Operator shall be able to reset their own account password.
      1. System must send an email to the Operator to reset their own account password.
2. Operator shall be able to **manage the jobs** for the day.
   1. Operator shall be able to view jobs for the day
      1. System shall display the full address of each job.
      2. System shall display the priority level of each job (High priority/ Low priority).
      3. System shall display the Runner each job is assigned to.
      4. System shall display the completion status of each job (Pending/ Completed).
      5. Operator shall be able to filter jobs based on Runner.
      6. Operator shall be able to filter jobs based on completion status.
   2. Operator shall be able to remove a job.
   3. Operator shall be able to create a new job.
      1. Operator must input the postal code of the job location and the building and unit number (if any).
      2. System must validate the postal code to ensure it is mappable.
         1. If it is unmappable, System must prompt the Operator to correct the postal code.
         2. If it is mappable, System must display the full address, including the street name, building name, building and unit number and postal code (if any).
         3. Operator must confirm the full address displayed.
      3. Operator must input the priority level of the job (High priority/ Low priority).
      4. Operator shall be able to input any special instructions for the job.
3. Operator shall be able to **manage Runners.**
   1. Operator shall be able to view the list of all Runners.
      1. Operator shall be able to select Runners to view their jobs list.
   2. Operator shall be able to remove a Runner.
   3. Operator shall be able to create a new Runner.
      1. Operator must create a unique username and password for the Runner.
      2. Operator must key in email for the Runner.
      3. System must add the Runner to the Runner list.
4. Operator shall be able to **view a list of active Runners**.
   1. Operator shall be able to select a Runner to view his current planned route.

## Runner Interface

1. Runner shall be able to **login to** the systemby inputting a unique username and password.
   1. If the password is invalid, System shall prompt the Runner until a valid password is inputted.
   2. Runner shall be able to reset their own account password.
      1. System must send an email to the Runner to reset their own account password.
2. Runner shall be able to **view his current planned route** on a map.
   1. Runner shall be able to click specific job locations to view details.
      1. System must display the full address of the job location.
         1. Runner shall be able to click the address to copy it to clipboard\*.
      2. System must display special instructions (if any) for the job.
      3. Runner shall be able to update completion status for the job when the job is completed.
3. Runner shall be able to receive notifications for new jobs assigned to him.

*\*The purpose of copying the address to the clipboard is to paste it into Google Maps.*

## Job Creation and Allocation

1. System must **allocate any new job created** to the most suitable Runner.
   1. System must check the priority level of the job.
   2. If it is a high priority job, System must allocate the job to the Runner whose immediate next location is closest to the new job.
      1. System must queue the job after the immediate next location of the selected Runner.
      2. System must update the Runner’s current planned route.
      3. System must update the Runner’s list of jobs for the day.
   3. If it is a low priority job, System must allocate the job to the Runner who will visit a location closest to the new job.
      1. System must queue the job after the location closest to the new job.
      2. System must update the Runner’s current planned route.
      3. System must update the Runner’s list of jobs for the day.
   4. System must display to the Operator which Runner has been allocated to the job.
      1. Operator shall be able to manually overrule the runner selected by the System.
2. System must **notify the Runner** of the new job.
   1. System must send a notification to the assigned runner with the new job details.

# Non-Functional Requirements

1. Performance
   * System must allocate jobs to Runners within 3 seconds of the operator submitting the job.
   * Location tracking updates must have a latency of no more than 2 seconds.
2. Scalability
   * System must support up to 500 concurrent users without significant performance degradation to response time and service availability
   * The real-time locating system shall be able to scale from managing up to IoT devices without loss of data fidelity or monitoring capabilities.
3. Reliability
   * System must ensure 99.9% uptime, ensuring availability during peak business hours.
   * After a failed operation (e.g. job allocation or notification delivery), System must retry operation within 2 seconds for up to 3 times, before reporting an error.
   * After a system reboot, the full system functionality must be restored within 5 minutes.
4. Usability
   * User interface must have a clean and consistent design, with easy-to-understand icons and clear labels.
   * System must include a help section to guide new users.
   * System must be displayed in the local language according to the user’s locale.
   * System must display date, time, and address formats according to the user's locale settings.
   * System shall comply with Web Content Accessibility Guidelines (WCAG) 2.1, ensuring it is usable by people with disabilities.
5. Security
   * Operators and Runners must log into the system with a password consisting of at least 8 characters, and at least a lowercase letter, a capital letter and a special character.
   * All sensitive data, including user credentials and location data, must be encrypted in transit and at rest.
   * System must enforce role-based access control (RBAC) to limit access to sensitive functionalities based on user roles.
6. Compliance
   * System must log all user actions related to job allocation and location tracking for audit purposes.
7. Maintainability
   * The codebase shall adhere to best practices for clean code, including modular design, well-documented functions, and consistent naming conventions.
   * System must be designed with ease of maintenance in mind, allowing for quick updates and bug fixes within 1 hour of downtime.
   * Automated testing shall cover at least 80% of the codebase to ensure reliability during updates.
8. Portability & Compatibility
   * System must be compatible with both iOS and Android devices.
   * System shall be able to operate and maintain a consistent user experience across various mobile devices, including different screen sizes and resolutions.
9. Interoperability
   * System shall be able to integrate seamlessly with external APIs, such as mapping services (e.g. Google Maps) for route optimization.

# Data Dictionary

|  |  |
| --- | --- |
| Term | Definition |
| Operator | Human user of the system that is responsible for entering location and managing Runners. |
| Runner | Person that moves between assigned locations to complete tasks (eg. repair worker). Runner follows routes created by the system based on the allocated location. A Runner is either active or non-active. |
| Active Runner | A Runner that is logged into the system, and can be assigned a job. |
| Job | A task assigned to a Runner, consisting of a delivery or action at a specific location, and can be marked as high or low priority. |
| Immediate next job | A job that a Runner is on the way to. |
| High priority job | A job that requires urgent attention. Will be queued *after the immediate next job* of the most suitable Runner.  Eg. Runner is going to Jobs A (immediate next job), B, C and D.  High priority job E will be queued after A. |
| Low priority job | A job that does not require urgent attention. Will be queued after the closest job found.  Eg. Runner is going for Jobs A (immediate next job), B, C and D.  Low priority job E will be queued after C if C is the closest job found. |
| Completion status | Indicates whether the job is “Pending” or “Completed”. |
| Current planned route | Route connecting the job locations that are currently being allocated to a Runner, in their allocated order or priority. |