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University of Pretoria

COS 730

Software Engineering 1

UPRM

University of Pretoria Research Manager
Software Requirements Specification

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1 Introduction

1.1 Purpose

This document serves as the software requirements specification (SRS) for UPRM (University of Pretoria Research Manager). The requirements will include both the functional and non-functional requirements. This document is written as a requirements guideline for the software enigineers and any other party involved in the creation of UPRM.

1.2 Scope

The UPRM scope consists of a/an,

- research manager, known as RM.
- statistics query tool, known as RMSQ.
- event/venue creation tool known as RMVC.
- report generator tool, known as RMR.

Description of each product within the scope of UPRM:

- RM - This will be the main focus for UPRM. This tool will assist the researcher with creating a new research "project". The user/s will have to be able to create a new project, enter the research topic, create an approximate timeline for the completion of the paper which can then relate to percentage of completion. During the writing of the paper, the user should be able to change or edit the research topic. Once the user has marked the paper as complete, the user/s should be able to submit the paper to venue/s of their choice registered on the UPRM system.
- RMSQ - The statistics query tool has its own subset of tools combined into one system integrated with UPRM. The statistics query tool will have to be able to generate statistics at a global system level as well as at a user based level. With the statistics query tool we will have to factor in privacy issues and hence only certain functionality will be granted to certain users based on preferences set by the main UPRM user of project leader. On a **global level**, the user will have to be able to generate statistics on the following:

  - Percentage of paper acceptance for institution.
  - Percentage of papers accepted per venue.
  - Percentage of papers accepted for certain user/researcher.
  - How many papers are currently being produced by the institution.
  - How many papers are currently being produced by a certain user/researcher.
  - Tracking the percentage of completion of a paper for a certain researcher.

- RMVC - The venue creation tool will be the access point to external venue organisers such as conferences and research papers. This will assist the organisers of such venues to easily call on papers as well as assisting the researchers in submitting their research paper to multiple venues. With this functionality in the UPRM the user/s will have to be able to create, read, delete and update **CRUD** their own venues. The deadlines for submissions will have to be posted or indicated that there does not exist a deadline for submissions. The venues will also then, after papers have been submitted, be able to send feedback to the researchers on their paper as follow:
  - Accepted (Published)
  - Accepted (Not Published)
  - Accepted with minor revisions
  - Rejected

- RMR - The report manager tool will generate exportable and distributable statistics in the format of the users choice that is supported by the UPRM RMR tool. This will be in the format of PDF or HTML or any other format the developer wishes to add. This tool will use the RMSQ tool to gather the statistics and will then export them to a new format as the RMSQ functionality only displays statistics which does not enable for distribution, unlike the RMR tool.

1.3 Definitions, Acronyms and Abbreviations

- **UPRM** - The system at hand, University of Pretoria Research Manager
- **RM** - Research Manager
- **RMSQ** - Research Manager Statistics Query Tool

- **RMVC** - Research Manager Venue Creation
- **RMR** - Research Manager Reports
- **MTTF** - Mean-Time-To-Repair/Restart/Resume (Length of time that is needed to restart/repair or resume operation of the system after a failure.)

1.4 References

References

[1] "Chapter 16: Quality attributes." `https://msdn.microsoft.com/en-us/library/ee658094.aspx`, February 2016.

[2] G. Inc., "Secure your site with https." `https://support.google.com/webmasters/answer/6073543?hl=en`, February 2016.

[3] E. J. Sermersheim, "Lightweight directory access protocol (ldap): The protocol." `https://tools.ietf.org/rfc/rfc4511.txt`, June 2006.

1.5 Overview

The remainder of this document includes an overview of the UPRM system functionality and system interaction with other systems. The text will also introduce different types of stakeholders and their interaction with the UPRM system. Some system constraints and assumptions about UPRM will also be stated and explored upon.

2 General Description

This section will give an overview of the whole UPRM system and its subsystems. In this section the UPRM system will be explained in its context, the different stakeholders will be introduced and the basic functionality of the UPRM system will be described. Throughout this section, the constraints and assumptions for the system will be presented.

2.1 Product Perspective

The UPRM system will consist of three basic systems. It will consist of a web server, that will manage the information of UPRM, a database server, that will store and retrieve information on research and venues, and finally a web interface, from which the user can then communicate with the UPRM system.

The web interface will not do any local computations, it instead will send requests to the web server, which will then authenticate the user privileges and act on the request accordingly. When responding to a request, the web server will use the information from the request to construct queries that will then be sent to the database server. Once the database server responds, the web server simply sends the information back to the local web interface that requested the specific service. The web interface will then use the response to redraw the interface and display the data.

Because of database and data-type constraints, titles of papers and venue names will be restricted to 256 characters. For easy use of the UPRM system, user details of researchers will be automatically gathered from existing databases (if any) such as the University of Pretoria **LDAP**[3] database. The user permission hierarchy will be assigned on the UPRM system database. The data that the UPRM system transmits during communication is valuable and sensitive data and hence we will restrict web communication to the secure HTTP protocol **HTTPS**[2].

2.2 Product Functions

Users should be able to log into the UPRM system using their existing employee sign-on details. After authenticated login procedures have successfully passed, the user should be able to **C.R.U.D** projects. As soon as a project has been created, the user should be able to create and update an approximate timeline by setting deadlines and the setting of approximate completion levels.

The user should be able to search for any project they are currently busy with as well as historical data of projects that they have been involved in. Depending on the permission level set by an administrator, the user should be able to search for specific projects by other employees and see specific information on that project such as the statistical data.

The user should be able to gather statistics on their own projects and be able to generate a report on it. Depending on the permission level of the user, set by an administrator, the user should be able to gather the statistics on other employee projects as well, and then be able to generate a report on the data.

2.3 User Characteristics

UPRM will have primarily three different types of users. Although all of them will interface with only the web portal, some aspects of the UPRM system will only be available based on which role the user acts in the UPRM system as a whole.

The first type will be the administrator user. This user will have all access to all functionality in the UPRM system. This user will also be able to change the role of another user or to remove them from any access to the system.

The second type of user will be a subset of the administrator user and will be the most common user of the UPRM system. This user will be able to only see information they are directly involved in. The information referred to in this section will be the project titles and particular statistics related to projects and venue acceptance statistics. This user will also be able to submit their projects to venues registered with the UPRM system and be able to read the feedback from the venue as well as check on the acceptance status from the particular venue.

The third and final user of the UPRM system will be the venue organisers and administrators. These users will have to register their particular venue with the UPRM system in order to recieve project applications. The user will have to be able to receive completed projects, write feedback on the particular project and set the acceptance status of the project. If the user has set a deadline for their venue, the user will have to be able to extend the deadline or renew the venue for a new deadline date. If no deadline is chosen by the user, then the venue will continuously be able to receive projects. This user will only interface with the UPVC part of the UPRM system.

2.4 General Constraints

The UPRM system is based on internet requests and replies and thus the system will always require an internet connection. The system is also heavily dependant on database capabilities and hence, the UPRM system will be constrained to those capabilities.

2.5 Assumptions and Dependencies

One definite assumption about the UPRM system that can be made, is that the performance of the system will greatly depend on the strength and speed of the internet connection the client has with the UPRM server(s). If the connection is slow and/or unstable, the UPRM system will have an increased waiting time for a response on a request and may even not respond at all. The UPRM system is also heavily dependant on a connection to a database. If this connection breaks or is not stable, then the UPRM system will not reply on any requests from the client.

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.2 Hardware Interfaces

3.1.3 Software Interfaces

3.1.4 Communication Interfaces

3.2 Functional Requirements

3.2.1 Functional Requirement/Feature Name

3.3 Use Cases

3.3.1 Use Case Name or Number

3.4 Classes/Objects

3.4.1 Class/Objects Name or Number

3.5 Non-Functional Requirements

3.5.1 Performance

For UPRM performance will not be a core non-functional requirement, however to make the system feasible and usable the following requirements must hold:

- The response time of any query should be < 5 seconds.
- The generation of any report or statistic should be at most 10 seconds.

3.5.2 Reliability

Any system that works with live data such as UPRM should be reliable to ensure the integrity of the data stored in the database.

The following requirements must therefore hold, UPRM

- should never crash while updating, creating or removing research projects.
- should perform any functionality as precise as specified in the functional requirements at any moment during the use of the system.

3.5.3 Availability

Availability is a crucial non-functional requirement as the updating and creating of research projects is the most important requirement of UPRM.

Availability requirements are as follows,

- UPRM have to be in a functional and working state for 95 - 99% of the time per year. Downtime will then be between 3.45 - 18.25 days per year.
- UPRM may not exceed a continuous downtime for longer than 3 hours.
- MTTF of UPRM may not exceed 30 seconds.

3.5.4 Security

Security is one of the most significant non-functional requirements as the data that is processed and stored by UPRM is of a sensitive nature. A vast amount of research ideas and the progress status on current research will be stored by UPRM needless to say, if such data falls into the wrong hands it could jeopardise the research project or the idea of the research.

In terms of security, UPRM should,

- never reveal the current progress of research projects to unauthorized parties.
- never reveal future research ideas to unauthorized parties.
- prevent the loss of any data (personal and research related data).

In terms of security requirements, UPRM should,

- make use of strong passwords.
- utilise two step verification.
- make sure that password resets is done by an administrator.

4 Analysis Models

4.1 Sequence Diagrams

4.2 Activity Diagrams

5 Change Management Process

TO ADD TEXT

6 Appendices

6.1 Appendix 1

6.2 Appendix 2

6.3 Appendix 3