Software Development Plan (SDP)
John and Jane Bed and Breakfast Manager (BBRM)

CMIS 330 6380 Software Engineering Principles and Techniques (2215)
SDP Project 4

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Table of Contents

1. Overview

1.1 Project summary

This document shall be the software design plan for the John and Jane reservation manager system developed to meet the specification requirements provided by the customers John and Jane, and specified in the System Requirements Document.

1.1.1 Purpose, scope, and objectives

This Document shall outline the entire process of development for the reservation manager system - including the project organization, schedule, Work Plan, Risk Management, and technical process plans - in order to meet the following customer requirements:

"... A system to manage the reservations and to monitor expenses and profits. When a potential customer calls for a reservation, they will check the calendar, and if there is a vacancy, they will enter the customer name, address, and phone number, dates, agreed upon price, credit card number, and room numbers. Reservations must be guaranteed by 1 day's payment. Reservations will be held without guarantee for an agreed upon time. If not guaranteed by that date, the reservation will be dropped."

The product to be developed shall be the Reservation Manager, which shall be composed of an accounting page and a calendar page. This Reservation manager shall maintain a database of reservations, through which it shall create, read, update, and delete reservations from the list via user interaction and certain constraints.

1.1.2 Assumptions and constraints

This product shall be developed for a Windows computer system with monitor, keyboard, and mouse setup. The reservation manager system shall be developed to accommodate the hardware limitations of John and Jane's bed and breakfast. It is assumed that the customers John and Jane will have a database system through which the reservation manager will create, read, update, and delete the reservation list.

1.1.3 Project deliverables

This product, upon competition, shall be delivered to John and Jane's Bed and breakfast by a designated technician of the development team. This technician shall install the reservation manager system onto the Bed and Breakfast hardware, via an executable file, and perform a test to ensure that the system has integrated properly with the database and other relevant systems on site. The customers John and Jane shall be briefed by demonstration on the use and functionality of the reservation manager system, and they shall be provided a user manual for reference.

2. References

Institute of Electrical and Electronics Engineers. IEEE Standard for Software Project Management Plans, IEEE Std 1058-1998. New York: IEEE, 1998.

Function Point Languages Table. (2017, April 20). QSM SLIM-Estimate. https://www.qsm.com/resources/function-point-languages-table

3. Definitions

Name	Description
Work Activities	Tasks to be accomplished by the development team
Gantt Schedule Chart	Chart of the full Schedule for the Project
UFP	Unadjusted Function Point, used to calculate Function point
FP	Function Point, used to determine the size of the project
LF	Language factor, used to calculate the KLOC, based on programming language
KLOC	Thousands of Line of Codes, used in project size calculations
COCOMO	Constructive Cost Model, an empirical estimation model used to estimate effort-schedule-cost
Organic Mode	Mode of COCOMO based on team size anr project type
Effort	Used in estimating schedule cost, expressed in staff months
TDEV	Development time expressed in staff months
Staff Size	Average staff size calculated form effort / duration

Waterfall model	Linear sequential model for planning a project life cycle
Risk Impact	Estimate cost a risk factor
Probability of Occurrence	Probability of a risk factor from 0 to 1
Weighted Impact	Weighted calculation of risk factor, risk Impact * Probability of Occurrence

4. Project organization

4.1 External interfaces

The two two external entities involved in the development in this project shall be the development team as the parent organization, and John and Jane's Bed and Breakfast as the Acquiring Organization.

4.2 Internal structure

This Project shall be organized to include the Project management team, the Software development team, and the quality assurance team. Versions of this project shall be maintained through Git.

4.3 Roles and responsibilities

- ➔ Project Management team shall:
  - ◆ Facilitate the gathering and communication of requirements, as well as oversee the software design and development phases of the project
  - ◆ Ensure that adequate staff is trained available to perform the required work
  - ◆ Select the appropriate process model for this project, and communicate this to the rest of the teams
- ➔ Software Development team shall:
  - ◆ Produce specification requirements based on customers statement of need,
  - ◆ Create Design plan for the project and produce a product size estimate through the LOC method
  - ◆ Develop the reservation manager system for the project
  - ◆ Produce test Specifications document and oversee testing phase and address bugs and anomalies reported
- ➔ Quality Assurance team shall:

- Test the product and report any bugs or anomalies
- Shall try to break the system in order to ensure no bugs or anomalies are missed
- Report Findings to the Development team and Project Management team

5. Managerial process plans

5.1 Work plan

5.1.1 Work activities

- Form teams
- Analysis Phase
  - Meet with customers John and Jane
  - Identify customer needs
  - Develop requirement specifications
  - Review requirements
- Design Phase
  - Develop Software design
    - Human to reservation system interface
    - Reservation system to database interface
  - Develop test specifications
  - Set milestones
  - Set budget
  - Approve budget and plan
- Development Phase
  - Develop prototype of system
    - Code calendar and accounting pages
    - Code reservation list
    - Code new reservation functionality
    - Integrate user interface and database interface
- Test Phase
  - Begin review and analysis process
  - Perform test cases
    - Report Bugs and Anomalies
- Continue development of system
  - Address Bugs and anomalies
  - Polish
- Review product with customers and stakeholders
- Ship Final Product

5.1.2 Schedule allocation

Figure 5.1 - Gantt Schedule Chart

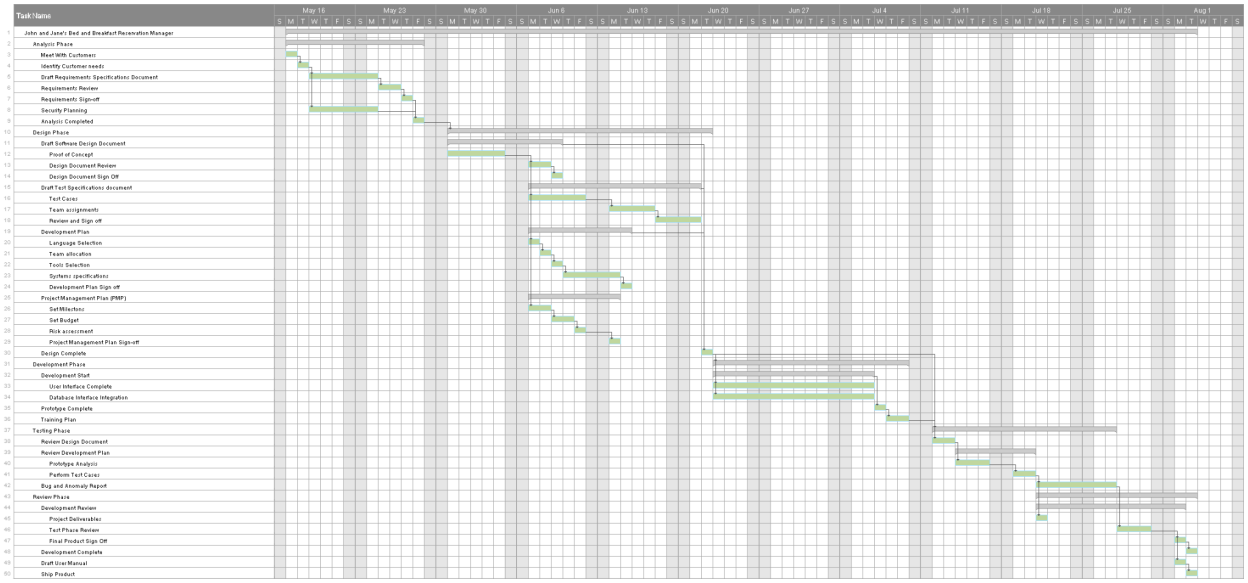

Figure 5.1 displays the Gantt Chart for the entire project schedule. It includes the analysis phase, design phase, development phase, test phase, and review phase for the project.

5.1.3 Resource allocation

- ➔ Software Development team:
  - ◆ 8 Software Engineers total
    - 3 Senior Software Engineers
    - 5 Junior Engineers
- ➔ Project Management team:
  - ◆ 4 project Managers total
    - 1 Lead Project Manager
    - 3 Associate Project managers
- ➔ Quality Assurance team:
  - ◆ 4 Quality Assurance Analysts total
    - 1 Senior Quality Assurance Analyst
    - 3 Junior Quality Assurance Analysts

Table 5.1 - Unadjusted Function Point Computation

			Weighted factor		Count
		Less Complex	Average	Complex	

Inputs	Expenses	3			
	Income	3			
	New reservation		5		
	name	3			
	address	3			
	Phone number	3			
	price	3			
	dates	3			
	Credit card number	3			
	Room numbers	3			
	One day payment	3			
	Hold status	3			
	Time limit	3			**41**
Outputs	Expenses	3			
	Profit	3			
	Reservation list		5		**11**
Inquiries	button	3			
	Reservation list		5		**8**
Internal Files	System Configuration file	4			**4**
External Interface	Database to system	3			

	User to system	3			**6**
Total UFP					**70**

Table 5.1 Displays the unadjusted function point computation used for calculating the function point of the reservation manager system.

Table 5.2 - Total Grade Rating for System Characteristics

Number	System Characteristic	Grade Rating
1	Data communication	1
2	Distributed data processing	4
3	Performance	3
4	Hardware configuration	3
5	Transaction rate	5
6	Online data entry	0
7	End-user efficiency	5
8	Online update	0
9	Complex processing	2
10	Reusability	5
11	Installation	1
12	Operations	5
13	Multiple sites	0
14	Facilitate change	3
Total		**37**

Table 5.2 Displays the Grade Rating for all 14 System Characteristics and their relation to the Reservation manager system. The Sum of these Grade Ratings is used to calculate the Function point of the reservation manager system

Function Point Equation:

$$FP = UFP * [[0.65 = 0.01]] * \sum F_i$$

$$FP = 70 * [[0.65 + 0.01]] * 37$$

$$FP = 1709.4$$

Language Factor (LF) -> C++ -> 53

$$SLOC = FP * LF$$
$$SLOC = 1709.4 * 53$$
$$SLOC = 90,598.2$$

KLOC = <u>90.6</u>

Effort Formula:

$$Effort\,(E) = a * (Size)^b$$

Project development time in staff months:

$$TDEV = a * (E)^b months$$

Average Staff Size (SS):

$$SS = Effort/TDEV$$

<u>COCOMO Organic Mode:</u>

$$E = 2.4 * (90.6)^{1.05}$$

Effort = <u>113.497</u>

$$TDEV = 2.5 * (113.497)^{0.38}$$

TDEV = <u>15.1 staff months</u>

$$SS = 113.497 / 15.1$$

Staff Size = <u>7.5</u>

5.2 Risk management plan

$$Risk\ Impact * Probability\ of\ Occurrence = Weighted\ Impact$$

Any risks encountered or conceived of by any member team shall be identified and communicated to the rest of the team and stakeholders. The risk impact shall be analyzed with the above formula. This analysis shall be used in developing a plan for risk mitigation that shall

be documented. Risks that are encountered shall be tracked through this documentation maintained by and distributed from the development team.

Risk	Relative Scale	Impact	Probability	Weighted Impact
New customer requirements	2	$614	0.3	$184.2
Loss of Team Member	2	$3,000	0.4	$1200
Significant anomaly reports	3	$3,070	0.6	$1,842

6. Technical process plans

6.1 Process model

Linear-Sequential (Waterfall) Model

- ➔ Project Milestones
  - ◆ Requirements specifications sign off
  - ◆ Analysis phase completion
  - ◆ Design Document Sign off
  - ◆ Test Specifications document Sign off
  - ◆ Development plan Sign off
  - ◆ Project management plan sign off
  - ◆ Design phase completion
  - ◆ Prototype Completion
  - ◆ Final Product Sign off
  - ◆ Ship Product

6.2 Methods, tools, and techniques

This Product shall be designed in the C++ language and written for Windows operating systems. Version control for the reservation manager system shall be maintained through Git and all major changes to the system shall be managed by the project leads. Access control shall be managed by the lead Software engineer and the senior quality assurance analyst. All product versions shall be tested via a distributed executable file on designated hardware systems of equal quality to the Bed and Breakfast system. This shall include a standard Windows operating system with

computer, monitor, mouse and keyboard setup. As well as an intra network database system through which the reservation manager shall have it's external interface systems tested. For quality assurance analysts, refer to Table 6.1 for the quality assurance plan for this project.

Table 6.1 - Quality Assurance Plan

Phase	**Sample Measure**	**Purpose**
Requirement Analysis	14	Size of System
Top-level Design	3	Size of system Architecture
Detailed Design	5	Design Progress
Code and Unit Test		Size of each code unit
Integration and Test		Completion progress for unit testing
System Integration and Test		Quality of Components
Qualification Test		Acceptability of final product

Table 6.1 provides a list of phases for the project that shall be referenced and updated by the Quality Assurance team.