System Analysis and Design UML

Student ID

Course Title

Date

WritingSol

DATE *****

Table of Contents

1. Planning: 3
1.1. Scope 3
1.2. Cost 4
2. Requirements Analysis 4
2.1. System Requirements Specification: 5
3. Design 6
4. Development 9
5. Testing 10
6. Implementation 11
7. Maintenance 12
References 13

WritingSol

Figure 1: Use case diagram for GA System 8
Figure 2: ERD for Global Adventures 8
Figure 3: Dataflow diagram for proposed system of GA 9

WritingSol

System Analysis and Design

1. Planning:

Global Adventures can either upgrade their system, or replace it with a more efficient and robust one. Even if the system is upgraded, it is likely to face many challenges after that because offline systems are quickly becoming outdated in this cloud-based and super-connected world where businesses and clients expect all the information to be readily available. Therefore, it is recommended that GA should replace the existing system with a new one which uses management information system (MIS) in which the hardware as well as the software serve as backbone of operations of the company. Management information systems for relatively less complex operations can also be developed using Microsoft Access which is cheaper yet far efficient system as compared to the manual system. However, there are many other options which can be considered once the company defines its cost, scope and timeline.

1.1. Scope

At present, two employees are directly using the system i.e. receptionist for making reservations and the accountant to produce reports and books for the company. The managers also rely on the system for decision making, but they are currently unable to reap full benefits of the information. In the future, the scope of business is likely to broaden. Besides the receptionist and the accountant, the clients should also be enabled to see information on website where an interface shows them available slots that can be reserved. This requires connecting the system to a server, adding the costs of reliable cloud services. The dependency of managers and the clients on the receptionist should end, and they should also be able to get information via the website.

However, the special privileges of the managers should be protected by credentials so that they can get access to confidential information which clients cannot.

1.2. Cost

The MySQL Enterprise Edition will cost nearly 5000 pounds to the company and the developer who will implement the system and will train the receptionist, accountant and managers will charge 5000 pounds for development and 1000 pounds for the training. The information will be placed on cloud server, and this service can range from 100 pounds per month to 300 pounds per month depending upon the selection of the vendor. Vendor options to consider are Huawei, Amazon Web Service (AWS), Microsoft Azure, Google Cloud Platform and IBM Cloud Services. Desktop clouds are easily to implement and Google Cloud Platform has a good reputation in this service domain [1]. The companies that do not trade off speed for cost like to choose Google cloud [2] which is recommended to GA as well.

Timeline: The system should be replaced in the duration of six months. Meanwhile, the previously implemented system will be used.

2. Requirements Analysis

The functional requirements of the Global Adventures Company include:

- viewing available rooms,
- updating the fare charges,
- deleting reservations
- viewing accommodation information
- Adding/viewing/deleting promotional packages

- generating reports
- adding/deleting new employee account

The functional requirements are associated with receptionist, managers, accountant and the clients, where the first two are also entitled to addition, updating and deletion tasks, while the later two can only view information. Admin is allowed to make changes in this MIS [3] and receptionist as well as manager can be given admin rights.

2.1. System Requirements Specification:

The company will work on System Requirements Specification Document that describes what the software will do and what are user expectations from the system. The SRS also explains system functions and ensures that the stakeholders needs are fulfilled. Some of the sections of SRS report will be as follows:

a. Introduction to system

   Describes purpose, abbreviations, audience, and scope of the project

b. Overall Description

   This part of the document narrates features, design of the systems, who are the users and how they can access and perform different tasks and what are different dependencies among different objects.

c. System Features

   This section will cover what are stimuli in the system and what are responses, what are tasks and priority of each task. Which tasks can be performed independently and which are dependent upon other tasks (for instance registration, payment and more). The

functional requirements will also be covered in this section in detail, which are identified above.

d. External Interface Requirements

The document will explain what will be user interface(s), what are hardware and software requirements associated with the system, how communication will take place within the system and how these components will be integrated.

e. Non-Functional Requirements

The document will describe how security will be ensured by the system and by the careful user behavior, how quality will be ensured and which measures will be taken to ensure 24/7 availability of the system which are important non-functional requirements [3].

3. Design

The system will be designed by first identifying the users and then identifying the tasks that will be performed using the system. The main users in this system are admin (receptionist and manager), clients and the accountant. The tasks performed by the system are viewing information (pertaining to tours, accounts, available slots), adding/updating and deleting information about available rental services, and generating reports. The admin will be able responsible for adding, updating and deleting the tours. Admin role, played by receptionist and manager, will generate reports when needed so that the performance can be compared over a period of time as shown in figure 1.

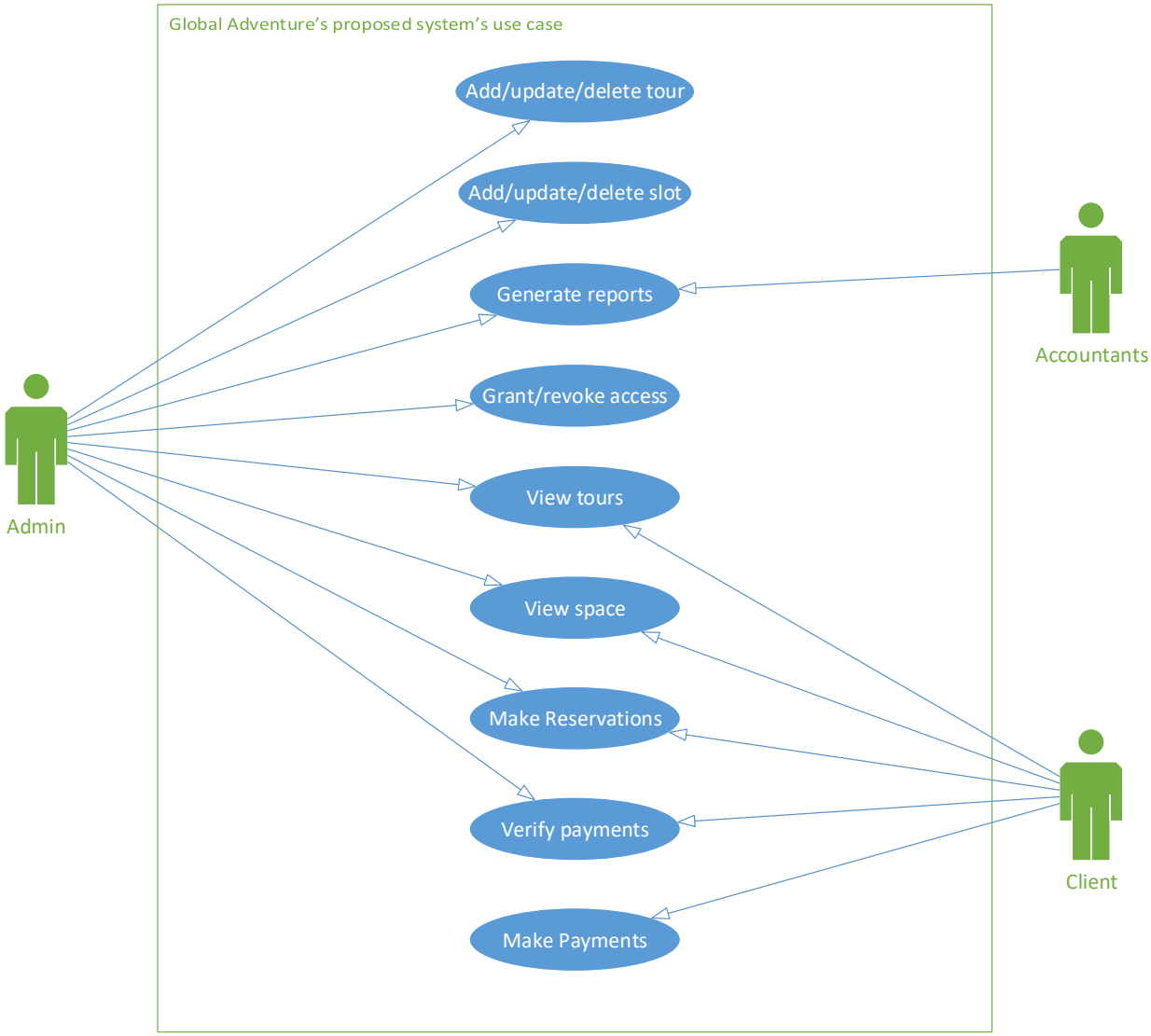

Figure 1: Use case diagram for GA System

The new system will not be as simple as an excel sheet file, rather it will have several interconnected modules which will enable selected views as shown in ERD figure 2. The views help in accessing only the relevant information.

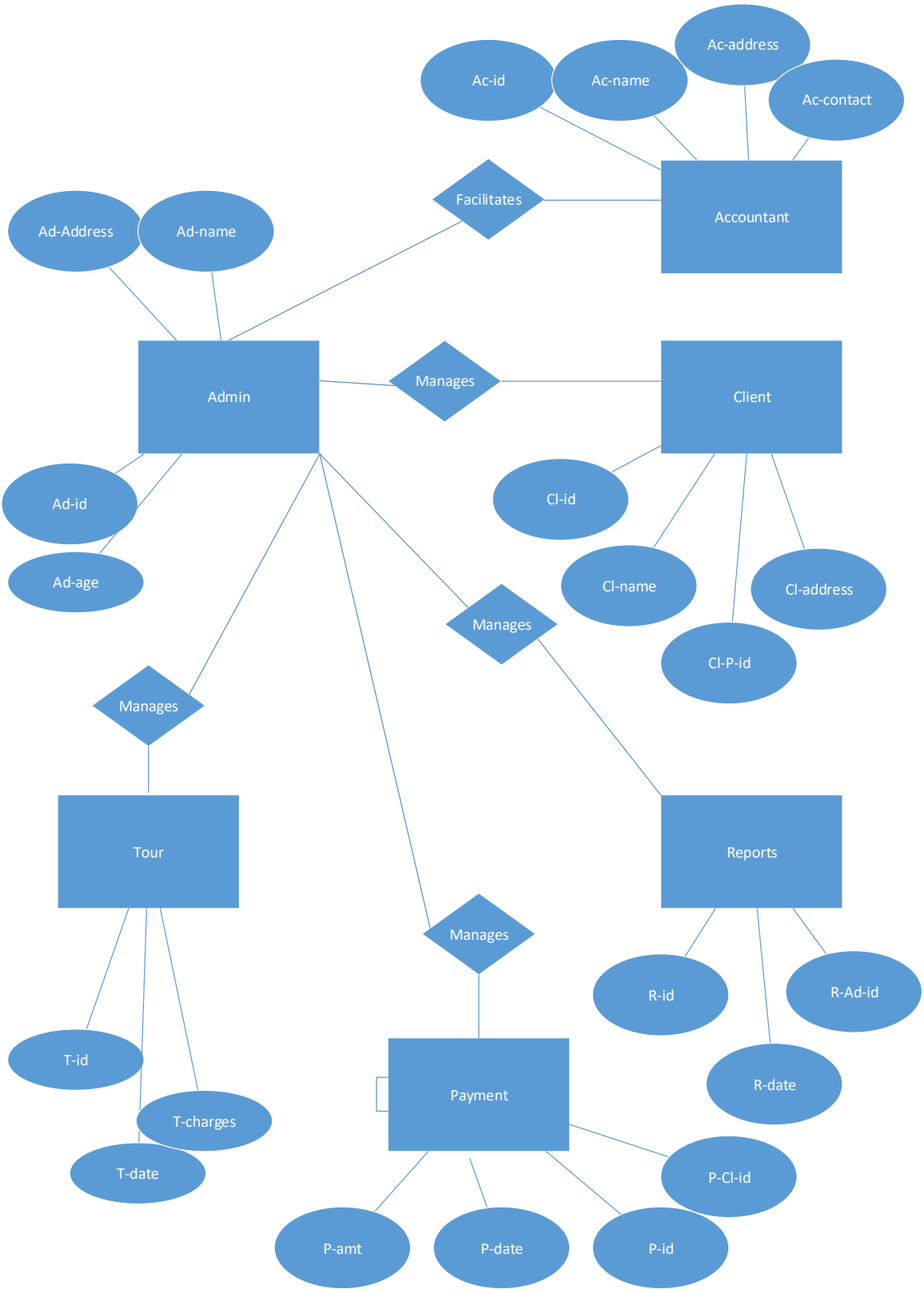

Figure 2: ERD for Global Adventures

For instance, the excel file shows seven or eight columns' data, while a view will show available rooms only if the user issued such a command. The system will show relevant information in the views and reports helping the user to focus on information that they need. Data flow among users and system will be streamlined as shown in figure 3. The guest (client) will pass through different stages to finally reserve the space in hotel. These stages will involve checking room availability, making reservation, confirmation, payment and then finally getting a slot in the hotel as shown in figure 3.

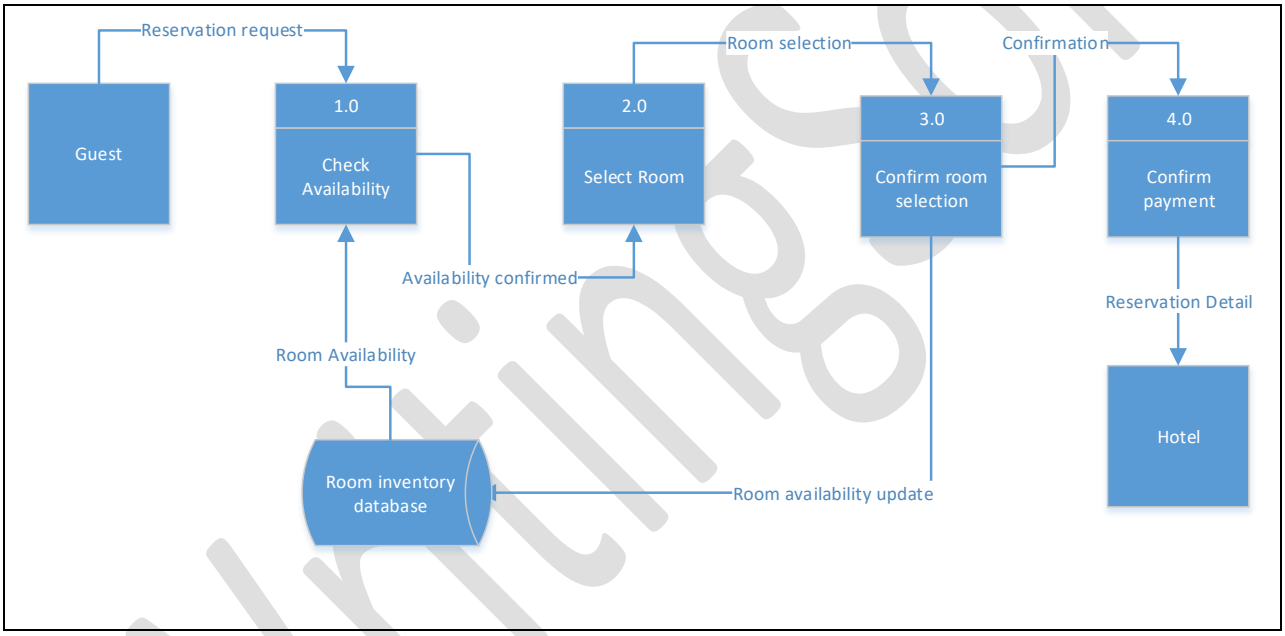

Figure 3: Dataflow diagram for proposed system of GA

The prospects clients will be able to see tour and space options without log in credentials, but they will be able to see their payment status and booking status only after login. The system also specifies the role of admin which will be enabled through login and password.

4. Development

The system development will take place by evaluating which system is more suitable to buy and whether the system needs any modifications to customize it according to company

needs or not. The company is recommended to choose most suitable Object Oriented MySql for development [4] and the system will be purchased and further modified by the developer hired for this project. MySql helps in entering and updating data through web as well. The in-house development is a suitable option here because the system is not very complex and can be developed by a developer. The project can be outsourced later when the company grows bigger and when there will be millions of clients using it and when it will become beyond capacity of company to handle technical sides of the system development/up gradation.

5. Testing

The software systems evolve with time and their some features might become outdated as well [5]. Therefore, it is important to test the software system in the start and end of development and even after the development and implementation are over, so that any errors, bugs and defects can be identified in the system. Testing is aimed at improving performance of the system and will be done primarily after development when the developer, selected clients and receptionist will perform several tasks to find whether system is generating required results or not. Quality and usability testing will ensure satisfactory system performance.

The timeline of project will be as follows.

	Week 1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20
Feasibility study																				
Analysis																				
Design																				
Prototype																				
Testing																				
Development																				
Evaluation																				

Writing Sol

6. Implementation

The system will be implemented in a couple of steps. First of all, all the necessary procurements will be made. The software and hardware will then be put in place after which the

coding, protocol implementation and access granting will take place. This step will be followed by inserting company data into the system so that the system becomes workable. Once the data is inserted/imported into the system, the relevant staff will be trained so that the system can be handed over to them completely. After the receptionist, manager, clients and accountant start using the system, the developer will be paid to monitor whether the system is working to achieve desired performance goals or not. Evaluation will be done twice during first year of implementation.

7. Maintenance

The maintenance phase will begin after a couple of months of implementation. Maintenance will focus on upgrading programs that are near license completion, installing software patches where needed, training employees if a need is identified, improving security through policy and software solutions and similar practices. Without maintenance, the performance of the system will slowly deteriorate affecting the profitability of the company and quality of company's decisions as well. Maintenance process helps identifying, prioritizing and solving problems in coding and implementation [6].

References

1. Shabani, I. and Dika, A. 2015. The Benefits of Using Google Cloud Computing for Developing Distributed Applications. *Journal of Mathematics and System Science*. Vol. 5. No. 4.
2. Krissaane, I., Niz, C, D., Sacristan, A. G., Korodi, G., Ede, N. et. al. 2020. Scalability and cost-effectiveness analysis of whole genome-wide association studies on Google Cloud Platform and Amazon Web Services. *J Am Med Inform Assoc*. vol. 27. No. 9. Pp. 1425–1430.
3. Shuo, Z. 2012. Design and Implementation of a Web-Based Tourism Information Management System: Travel-SYS. *UPPSALA University Department of Information Technology*. [Online]. Available at: http://uu.diva-portal.org/smash/get/diva2:490645/FULLTEXT01.pdf
4. Karma, G. M. and Sustani, J. 2018. Development of Integrated Information System for Travel Bureau Company. *Journal of Physics. Conference Series*. [Online]. Available at: https://iopscience.iop.org/article/10.1088/1742-6596/953/1/012096/pdf
5. Bocij, P., Greasley, A. and Hickie, S. 2008. *Business Information Systems: Technology, Development and Management.* (Harlow, England: Pearson Education)
6. Akhlaq, U.and Yousaf, M. U. 2010. Impact of Software Comprehension in Software Maintenance and Evolution. Master Thesis, Computer Science, [Online]. Available at: https://www.diva-portal.org/smash/get/diva2:829443/FULLTEXT01.pdf