Graduate Diploma in IT

Level 7

GIT703: Systems Development Integration

20 credits

Assessment 2: Case study research

(Worth 60% of final Mark)

(60 Marks)

Case Study: Creating Time keeping system

In order to optimize production processes, providing clear working time management on the plant, and calculating KPIs for each worker, the management of the “Helicopter” company has hired your company (Best Software Ltd) to develop a “Time keeping” system.

Time keeping system should optimize Helicopter Final assembly process. Final assembly process in “Helicopter” company is divided into several stages. For each stage in SAP ERP created production order. Each production order has a list of final assembly operations and quality control operations that should be completed. Each final assembly operation executed by workers and after completion should be checked by Quality controller. That is why each final assembly operation has a corresponding quality control operation.

The main goal of time-keeping process is to calculate actual labor time per each operation (final assembly and quality control) and employee.

Calculation of actual labor time is based on time-stamp of activity events:

For worker of assembly line:

- Start operation
- Interrupt operation
- Finish operation

For Quality controller:

- Start operation
- Interrupt operation
- Final confirmation

Calculation of actual labor time excludes breaks and the time between shifts (not working time).

If the confirmed time (actual time) is more than assigned time (planned time) for particular operation system should give possibility to choose the reason of exceeding time.

“Time keeping” should provide KPIs for each worker. This data is used for making decision about production line optimizing, minimize downtime and reduce costs of production.

Time keeping system should calculate 3 main KPIs for each worker:

- Index of productivity (shows how many time employee spends on production operations during the day)

$$InProd = \frac{Shift\ time\ \ (without\ breaks)}{Confirmed\ Time}$$

- Index of present (shows how often employee breaks production discipline)
  - $$InPres = \frac{Shift\ Time\ (without\ breaks)}{Time\ on\ production\ area\ (without\ breaks\ and\ Not\ Authorized\ Outs)}$$

- K factor (shows how close to the assigned time employee can do his Job)

$$K = \frac{Confirmed\ Time}{Assigned\ Time}$$

Determined parameters can increase the level of employer's motivation and can be used for calculating the amount of recognition.

Time keeping system should give the production line managers all necessary reports to analyze information of working hours spent for Aircraft assembly, efficiency of assembly process.

In order to estimate Time on production line Time keeping system should integrated with current Access Control System.

The seamless integration of the "Time keeping" solution with the main ERP system can give to management the real information about time spent time on producing particular helicopter.

Time keeping should Avoid the use of mouse and keyboard for input data in the system. System should support touch technology and barcode readers for scanning the operation ID.

In terms of the hardware, Time keeping solution should have at least 4 terminals with touch-screens and barcode readers, which will be installed on production line.

Time keeping system should have simple and friendly interface for workers and quality controllers with the minimum number of steps for entering information about actual labor time for each worker per each operation.

You will require understanding the case study to answer all the questions and perform the tasks given in the deliverable section of this assignment.

ASSIGNMENT DELIVERABLE

You will need to submit a written report of no more than 12 pages, addressing the following main issues based on the given case study.

You are required to perform the following tasks and document in the form of a comprehensive report.

1. **Introduction**: Write an introduction about your Time keeping solution. The introduction should include a background, business need and the proposed solution.
   (10 marks)

2. **Requirements:** Investigate the functional and non-functional requirement of the case study. Use the specified template (IEEE requirement specification template) or any standard template for recording the requirements. **(10 marks)**

3. **Design – High level Design:** What are the high level functional components of the system? What kind of information they sent to each other? What external system should receive/send information to your system? Draw diagram of the main

components with relations and sending/receiving information including relations with external system.

(10 marks)

4. **Design – Use case, activity diagrams:** Draw the use case diagram for your system and the activity diagram for each use case.

(10 marks)

5. **Design Interface Design:** Draw screen flow diagram and wireframes of the application interface

(10 marks)

6. **Functional Testing:** Write a test plan with at least 10 test cases.

(10 marks)

STRUCTURE AND FORMATTING OF THE WRITTEN REPORT:

1. The written report must follow the structure given below.

    - Assignment cover page
    - Introduction
    - Functional and non-functional requirements
    - Design
        i. High level design
        ii. Use Case diagram
        iii. Activity diagrams
        iv. Interface design
    - Testing strategy
    - References

2. The report must adhere to the following format:
    - Use standard fonts (10-12) for text and heading in Microsoft word.
    - Submit as a single Word document.

DATE DUE

The report is due _____**.** It must be submitted through online system.

MARKING SCHEDULE

Criteria	Description	Possible Marks	Achieved Mark
Introduction	• Background • Business need • The problem statement • The proposed solution	2 2 2 4	
Requirements	• The functional requirements are correctly identified • The non-functional requirements are correctly identified • The length of the document is appropriate	4 4 2	
Design High level design	• Main functional components of the system are listed correctly • Relationship among the components and relevant information has been shown • External system and relationships are correctly identified	4 4 2	
Design Use case, activity diagrams	• Use case diagram is correctly identified • Activity diagram for each use case has been drawn • Proper UML standard have been followed	4 4 2	
Design Interface design	• Screen flow diagram has been drawn • Wireframe for each screen has been drawn	4 6	
Functional testing	• Appropriate test plan has been developed • 10 test case has been designed. • The result of each test case has been reported	2.5 5 2.5	
	Total	**60**	