ICT284 Systems Analysis and Design

Assignment 2

Worth: 25% of your final grade.

Due: See LMS

Submit to: LMS, via the Assignments tool. Submit as a single Word document including all parts of the assignment. Ensure you complete the declaration that is part of the submission process, and click all the way through to the final 'submit' button. Simply uploading your assignment does not submit it.

You do not need to include a separate cover sheet but you should include your name and student number as part of your document filename. Your name and student number should also be included in the assignment document.

Late assignments that do not have an extension will be penalised at the rate of 10% per day.

The assignment requires you to carry out some systems analysis and early systems design activities for the Fresh Colour Painting system described here. Read the case study on the next page and answer questions 1-10 following.

Summary of what to submit:

(Refer to Assignment 2 rubric for a detailed description of marks breakdown and marking criteria)

Question	Task	Marks
1	Stakeholders	5
2	Functional and non-functional requirements	10
3	Use cases	10
4	Domain model class diagram	13
5	CRUD matrix	12
6	Fully-developed use case description	10
7	Activity diagram	10
8	System Sequence Diagram (SSD)	10
9	State Machine Diagram (SMD)	10
10	User acceptance test plan	10
	TOTAL MARKS	100
GENERAL	Up to 5% (5 marks) may be deducted based on the overall Organisation and Professionalism of the submitted file- refer to the marking rubric.	(5)

The case study: Fresh Colour Painting System (FCP System)

"Fresh Colour Painting" is a fast-growing online business that links together customers who need an expert residential painter with professional painters who provide painting and decoration services. Customers can provide their location and painting needs and requirements and are presented with a shortlist of potential painters who may be able to provide what they need. FCP is somewhat similar in concept to the painters service provided through One Flare at https://www.oneflare.com.au/painters

FCP has been partly manual for the first year of their operation, but now needs a new online system to automate their business of putting together the right customer with the right painter. They intend to roll the system out nationally, from their home state of NSW. Artie Brush, the founder and director of FCP, has contacted the work to you to lead this project.

The two sides to the system are the painters and the customers. Painters register on the FCP system by providing their name, description, types of services they provide (selected from a list), their location (city and postcode), links to their own website and social media accounts, and contact email. "Checked" painters are painters who have provided their ABN, business name, logo, work permit, and proof of their white card and licensing and registration information as well as their public liability insurance to the system. Using a checked painter provides additional confidence to customers that they are using a legitimate tradie.

If they want, the painter can also advertise themselves as having an 'On-Time Guarantee'. This means that they guarantee to provide the service on time, and if they are more than an hour after the scheduled time will reimburse the customer $200. Painters can also use reviews from previous satisfied customers in their profile, and their average rating by customers.

Painters pay to use the FCP system: this is done through purchasing a number of 'credits' when they register. Payment for credits is done through PayPal outside of the FCP system, although FCP also keeps a record of the transactions. Credits are used for preparing quotes for customers, with every quote costing the same number of credits. Credits expire after three months, and the system will notify the Painter that they need to purchase more credits in order to be able to quote. The system also notifies the Painter if they have run out of credit.

Customers do not need to pay in order to use the FCP system. When a customer requires a quote for a painting job, they submit their requirements through an online form. They supply their postcode location and a list of requirements, including category of the painting job (Residential, Commercial, Decorative, Restoration painting etc); type of service (Interior Painting, Exterior Painting , Touch-Up Services, Colour Revival, etc); type of rooms or surfaces need to be painted (kitchen, living room, bathroom, doors, walls etc…); budget per job; materials required- if not supplied (paint, brushes, rollers , etc), job date, and any further instructions. They also supply an email address they can be contacted through. This email address also provides them with access to their account where they can see the status of all their job requests. The account is created when they submit their first job request.

Once the customer request for a painting job has been submitted, the FCP system matches the request with the painting services that are registered with it, and determines two

painters that could best meet the customer's requirements. These painters are then notified via email that there is an open request for quotation.

The painters then respond to the customer with a detailed quote. The quote includes the cost estimate, a flag indicating whether further information is required for a complete quote, and any comments. This information is provided in an online form that the painter completes, and the system sends to the customer.

The customer receives an email including the same information that the painter has provided in the quote form. The painter and the customer may then discuss the job directly (outside the FCP system) in order to arrive at a final decision. To help make up their mind, the customer may also read more about the painter in the profile they have provided to FCP, the painter's own website and social media accounts, and in the reviews that have been posted to FCP.

Once the customer has decided on a painter, they return to their account on the FCP site and choose the 'selected' option against the relevant painter's quote for the job request. When this has been done, the other painter who quoted is automatically notified that their quote was unsuccessful. If none of the quotes suits the customer, they may choose to enter 'no-match' directly against the quotes.

If no quotes are received within 24 hours of posting the job request the customer is notified and the request is closed. A customer may also decide that they wish to cancel the job request any time before making a booking, and record this against the job request in their account.

Customers are encouraged to provide feedback on the service that their painter has provided. After the job is completed, the customer can log in to their account and leave a 5-star rating and associated comment against the job. To prevent spurious reviews, it is only possible to post a review for a service that is recorded as being booked by that customer. When the review is posted, the feedback recorded against the painter is updated for other potential customers to browse through on the FCP site.

Obviously, the success of FCP depends on its ability to provide the best expert painters for a customer so that they can be confident in using it. Various summary reports are provided each month so that Artie can monitor the health of the business. These include the percentage of quotes that were successful in obtaining a booking for a painting job; and the average satisfaction rating of completed painting jobs. The revenue to FCP in terms of payments for credit is also reported, broken down for each capital city.

TO DO:

Answer questions 1-10 below. Note the following points:

- You may need to make assumptions where information in the case is incomplete: **state any assumptions clearly**. You can also ask questions on the forum.
- Your **diagrams** should be drawn using Visio (or suitable alternative that creates UML diagrams). Use the appropriate template for each diagram type. Make sure your diagrams are clear and readable.
- Your diagrams must follow correct UML notation and naming conventions, and **each diagram should include a title and legend.**
- Your models, diagrams and discussions should be **consistent** with one another throughout your analysis and design.
- Ensure your work is clearly and professionally **presented**, proofread for spelling and grammar, with a title page and table of contents. Start each main question on a new page. There are marks allocated to the overall organisation and presentation of the Assignment, please refer to the assignment's rubric for more details.
- **Academic misconduct** is treated seriously, and penalties may apply. Instances of academic misconduct include submitting work that has been produced either in part of whole by someone else or using Artificial Intelligence tools.

Q1. List the main **stakeholders** for the Fresh Colour Painting system (FCP). For each stakeholder, write a brief description of their interest in the system and what aspects of it are of particular relevance to them. Don't include the systems development team.

Q2. (a) List and briefly describe the main **functional requirements** for the FCP.

(b) List and briefly describe the main **nonfunctional requirements** for the FCP.

Q3. (a) Use the **User Goal technique** to develop a list of **use cases** for the FCP. Present your list in a table that includes the participating actors, use case name and a brief use case description.

(b) Use the **Event Decomposition technique** to identify any **additional use cases** for the FCP. These will probably be temporal and state event types. Present your list in a table that includes the event, type of event, use case name, and brief use case description. You do not need to repeat the use cases you identified in (a) here.
(Note that some use cases are already identified in Q6,7,8, below. Include these in your lists.)

Q4. Create a **domain model class diagram** for the FCP, including all classes, attributes, associations, and multiplicity. Show association classes and generalisation hierarchies where appropriate.

Q5. Create a **CRUD matrix** to check the consistency between your domain model class diagram and your **complete** list of use cases. Set this out in the form of a table with classes as the columns and use cases as the rows. If you find discrepancies between the models while you are doing this, you should go back and correct your earlier models as required so that your final set of models is consistent.

Q6. Create a **fully-developed use case description** for the use case ***Submit Online Form*** *submitted by a customer***.** Follow the template provided at the end of this handout.

Q7. Draw an **activity diagram** to represent the flow of activities for the use case ***Print credit payments report.***

Q8. Draw a **system sequence diagram** for the use case ***Provide feedback.***

Q9. Draw a **state machine diagram** to show the possible states and transitions for a **Painting Job** object. Label each state with the state name. Label each transition with the appropriate transition name, guard condition (if appropriate) and action expression (if appropriate).

Q10. Develop a **user acceptance test plan** for a **customer** of the FCP system. Base it on the relevant use cases you have identified. You can follow the example in the textbook (below). Present your test plan in a table including the fields: use case name, test conditions, expected outcomes. You do not need to include testdata.

	A	B	C	D	E	F
1	Spec ID	Cross refer to use case	Short description	Test conditions	Expected outcomes	Comments
2	10	101	Maintain customer Info	Add customer, update customer, delete not allowed	New customer with all fields, updated customer with selected fields	
3	11	201	Maintain sale info	Create sale, update sale, finalize sale, pay for sale	New sale in DB, update selected fields, payment creates transaction	
4	12	202	Ship items	Display items, update status	Sale update, sale items updated, shipment created	

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Use Case Name:		
Scenario:		
Triggering Event:		
Brief Description:		
Actors:		
Stakeholders:		
Preconditions:		
Postconditions:		
Flow of Activities:	**Actor**	**System**
Exception Conditions:		