Desk Number _____

Student Number _____

Student Name _____

School of Electrical Engineering & Computing

EXAMINATION

Semester 1, 2018

SENG2130 Systems Analysis and Design

This paper is for CENTRALCST and CALLAGHAN students.

Examination Duration: 180 minutes

Reading Time: 10 minutes

This exam has _9__ questions

Exam Conditions:

This is a FORMAL examination

This is a RESTRICTED OPEN book examination

1 A4 double sided sheet of handwritten or typed notes (Memory Aid sheet)

No calculators are permitted

Materials Permitted In The Exam Venue:

none

Materials To Be Supplied To Students:

1 x 12 Page Answer Booklet

Special Instructions:

Your name must be on the memory aid sheet and it must be handed in with your exam booklet.

This is a sample exam only. There is no guarantee that the questions appearing here will be on the final exam. Nor is there a guarantee that they will be excluded. Make of that what you will. This is simply to give you a taste of the structure of the final. Most of the questions here are from the labs and workshops presented during the course. Best wishes for the final.

Question 1 [**20 marks – 4 marks each**]

a) Explain how, when conducting **risk analysis**, one might assess the **likelihood** and **consequence** of a risk.

b) Explain why **post-delivery maintenance** should not be performed by unsupervised beginners or less than competent programmers.

c) List FIVE activities when considering the **acquisition** of new supporting infrastructure.

d) List and explain THREE activities when **defining the scope** of a project.

e) Consider a file system with a graphical user interface, such as Macintosh's Finder, Microsoft's Windows Explorer, or Linux's KDE. The following objects were identified from a use case describing how to copy a file from an USB disk to a hard disk: File, Icon, TrashCan, Folder, Disk, Pointer. Specify which are **entity objects, which are boundary objects, and which are control objects.**

Question 2 [**8 marks**]

Decide the **architecture style** for the following system. A system in which,

- Your application is server-based and will support many clients.
- You are creating Web-based applications exposed through a Web browser.
- You are implementing business processes that will be used by people throughout the organization.
- You are creating services for other applications to consume.
- You want to centralize data storage, backup, and management functions.
- Your application must support different client types and different devices.

Question 3 **[8 marks]**

Consider the following design goals. For each of them, indicate the **candidate pattern(s)** you would consider to satisfy each goal:

Adapter pattern, Bridge pattern, Strategy pattern

• Given a legacy banking application, encapsulate the existing business logic component.
• Given a chess program, enable future developers to substitute the planning algorithm that decides on the next move with a better one.
• Given a chess program, enable a monitoring component to switch planning algorithms at runtime, based on the opposing player's style and response time.

Question 4 [**8 marks**]

a) In terms of ethical responsibility, explain the following terms; **Responsibility, Liability, Due Process**

b) In terms of user interface design, explain the following terms and indicate why they may be important; **Consistency, Recoverability, Affordance**.

Question 5 [8 marks]

Describe in detail the waterfall software development methodology. In your description, mention and outline the important lifestyle activities that make up the methodology.

Question 6 [**8 marks**]

Create the first level of **Use Case Diagram** for the online shopping system descripted as follows:

Web Customer (actor) uses some web site to make purchases online. The first level use cases are **View Items, Make Purchase, Checkout** and **Client Register**. **View Items** use case could be used by Web customer if customer only wants to find and see some products. This use case could also be used as a part of **Make Purchase** use case. **Client Register** use case allows Web customer to register on the web site, for example to get some coupons or be invited to private sales. Note, that **Checkout** use case is included use case - checkout is part of making purchase.

Question 7 [10 marks – 5 marks each]

a) On-line surveys are a **web-based metaphor** for the familiar paper based surveys. Explain why this is such a successful metaphor and give an example of where the metaphor breaks down.

b) Give another **computing metaphor** explaining why it is useful and where it breaks down.

Question 8 [10 Marks]

Based on the following scenario, produce an **Activity diagram**.

The shipping department receives all shipments on outstanding purchase orders. When the clerk in the shipping department receives a shipment, he or she finds the outstanding purchase order for those items. The clerk then sends multiple copies of the shipment packing slip. One copy goes to purchasing, and the department updates its records to indicate that the purchase order has been fulfilled. Another copy goes to accounting so that a payment can be made. A third copy goes to the requesting in-house customer so that he or she can receive the shipment.

Once payment is made, the accounting department sends a notification to purchasing.

Once the customer receives and accepts the goods, he or she sends notification to purchasing. When purchasing receives these other verifications, it closes the purchase order as fulfilled and paid.

Question 9 [20 Marks]

DownTown Videos is a chain of 11 video stores scattered throughout a major metropolitan area in the Midwest. The chain started with a single store several years ago and has grown to its present size. Paul Lowes, the owner of the chain, knows that to compete with the national chains will require a state-of-the-art movie rental system. You have been asked to develop the system requirements for the new system.

Each store has a stock of movies and video games for rent. It is important to keep track of each movie title to know and to identify its category (classical, drama, comedy, and so on), its rental type (new release, standard), movie rating, and other general information such as movie producer, release date, cost, and so forth. In addition to tracking each title, the business must track each individual copy to note its purchase date, its condition, and its rental status. User functions must be provided to maintain this inventory information.

Customers, the lifeblood of the business, are also tracked. DownTown considers each family to be a customer, so special mailings and promotions are offered to each household. For any given customer, several people may be authorized to rent videos and games. The primary contact for each customer can also establish rental parameters for other members of the household. For example, if a parent wants to limit a child's rental authorization to only PG and PG-13 movies, the system will track that.

Each time a movie is rented, the system must keep track of which copies of which movies and games are rented; the rental date and time and the return date and time; and the household and person renting the movie. Each rental is considered to be open until all of the movies and games have been returned. Customers pay for rentals when checking out videos at the store.

a) [**10 Marks**] Develop a **class diagram** based on above scenario. Identify the boundary, entity, and control objects that are necessary for implementing the software. If you need to make assumptions, also note them.

b) [**10 Marks**] Develop a **sequence diagram** for the above scenario.

END OF EXAMINATION