****UOW-logo

Project Specification:-

Due to recent business and legal developments, a firm specialising in the storage of biological materials is contracting you to provide them with a desktop based system which can run in the network environment (Client / Server architecture) that will keep track of details regarding biological samples that are preserved at very low temperatures. More details about the firm, Cryo Cell Corporation (CCC) and its operations (including a sample invoice) can be found in the following paragraphs.

The concept of freezing organisms to preserve them has been around (at least in literature) for some time. There are, of course, a number of legal and ethical issues involved in such a practice. A major technical hurdle has been that the density of water is at its highest at four degrees Celsius (i.e. above the freezing point of water) so that living systems that are frozen alive cannot be thawed (unless they are very simple organisms) and returned to life. Alternatively, cells can be kept almost indefinitely at very low temperatures (using liquid nitrogen at -196 deg. C). Thus there is considerable interest around the world in keeping certain types of cells (e.g. stem cells – the building blocks of the immune system) preserved in order to provide a safeguard in case of serious illness (e.g. diabetes, cancer) later in life.

CCC is a firm that intends to provide a cryogenic storage facility. CCC has developed a storage process for small aliquots of cells (i.e. 2ml) kept at –196 °C which uses specially-developed refrigerated storage tanks, coupled to back-up power and uninterruptible power supplies in case of power failure.

The business process involves a client registering with CCC, providing details such as name, postal address, email address, age, gender and phone contact details and agreeing to specific terms and conditions as well as completing an on-line questionnaire to check whether the sample to be stored is at risk from various infectious diseases. Assuming that the client is acceptable to CCC (i.e. the cells pass the tests) then the sample is collected from the client in a sterile environment. Details about the collection point such as name, address, requested pickup date/time and courier firm authorised to transport the sample are recorded. The sample is then placed in a cryo-shipping container provided by CCC (uniquely marked with a barcode), transported to CCC’s facility in Perth, assigned a unique sample identifier and transferred to a special cryogenic sample container (CSC), frozen and placed in one of several cryogenic refrigerators until requested again by the client or the trustee of the client. The date of storage is recorded within the sample identifier, as is the location, fridge, CSC number and position within the CSC matrix. A CSC can hold up to 16 samples. There may be up to 99 refrigerators in any location. Each location has a unique three-character identifier. A second sample is taken from the client after six months and tested to confirm the absence of any infectious diseases. If a sample is found to contain any infectious disease, it is destroyed and the prior sample (if any) also destroyed. The pro-rata annual fee is then refunded to the client.

A client must pay the required (once-off) testing and (annual) storage fees. If a client fails to pay the annual fee within the prescribed time (one month after an invoice is issued) then CCC is at liberty to destroy the stored sample. Fees can only be paid by credit card (MasterCard or Visa). A client has the option to request payment in four equal instalments via automatic debit of a credit card when a payment falls due.

As CCC is operating in UK, it is bound by the UK Privacy Principles. Due to these principles, not all employees of CCC have (or require) equal access to client or sample information. Client Account Managers need access to client details but not sample locations. Laboratory Technicians need access to sample data in order to record the results of tests and the location of samples within containers and refrigerators. In order to comply with the APPs, an audit function which records creation, modification, access and deletion of information is required. This function can only be accessed by a Laboratory Manager. New staff users of the system can only be created (by a Lab Manager) if they exist on the CCC Human Resources system.

If both samples collected from a client are certified disease-free, they are both stored on behalf of the client, although not necessarily in the same container or refrigerator. The identity of the technician who certified the sample(s) is also recorded.

A staff-only search facility is required to enable samples to be found whatever their identifier, container, refrigerator or location. Samples can be in storage, in transit, delivered to the client or destroyed.

A client (or trustee) can request that a sample (or samples) held by CCC be destroyed. Before this is done, a client must request this action via email, upon receipt of which CCC will email the client (or trustee) for confirmation, enclosing a link to a secure form for this purpose. When the form is submitted to CCC the sample is destroyed according to the procedure specified in the appropriate UK Standard for disposal of biological samples.

CCC is considering creating a desktop based java application that will allow clients to look at the services provided by CCC, send requests for sample destruction, pay invoices as well as send enquiries. In addition the application would let customers check on the status of their sample and staff search for samples, retrieve client details and examine audit records.

As a part-time developer you are required to develop the above said system using Java.

**Tax Invoice (Sample)**

Cryo Cell Corporation

The Buxton, 6th Floor

Abbey Square, Reading RG1 3BE

**Invoice** Date: 11/06/2014

**Invoice # :** 1234567

Client: A Person Client ID : 00479

45 Marylebone Road

London

NW1 5LS

Storage of Sample ID: S1-20140611-PER-F02-CSC12-1

From 08/10/2014 to 07/10/2015

Item Description Amount

1 Initial test £125.00

2 Annual storage fee (in advance) £100.00

Total Due: £225.00

**You are required to,**

1. Create a Java Rich GUI Window based Application with functional decomposition, using necessary validations for inputs and appropriate good coding practices for the above expectations of the customer **[10 Marks]**
2. List down the list of functional and non-functional requirements. **[05 Marks]**
3. Create Use case Diagram **[05 Marks]**
4. Create class diagram with different type of relationships, multiplicity, direction, role and stereotypes [**10 Marks]**
5. Define appropriate user-defined data types to model the data of the application. **[05 Marks]**
6. Implement the functionality specified in the case study **[15 Marks]**
7. The application should support Object Oriented facilities provided by Java **[10 Marks]**
8. Authentication and authorization: The application should have login functionality with multiple users with different access control and password should be encrypted and stored in DB **[10 Marks]**
9. Logging functionality: Your application should use log (see: Log4J) **[05 Marks]**
10. Localization: Your application should support two another language other than English (see: Globalization and Localization) **[05 Marks]**
11. Generating Report: Use reporting tool to generate dynamic reports (see: Jasper iReport) **[05 Marks]**
12. ERD: ER Diagram with cardinalities, attributes, and necessary keys **[05 Marks]**
13. Write appropriate test cases to test your application. You are expected to carry out black-box testing and white-box testing which should include valid and invalid scenarios covering all functional requirements. **[10 Marks]**

Please make sure you add and format your source code to the report along with other report content before printing. Marks will be allocated for presentation.

You should hand in the following at the campus office:

* Include a CD (soft copy) with your source code and the final report
* Final report should consists of following sections
  + Table of content
  + List of Figures and List of Tables
  + Introduction
  + Analysis
  + Design
  + Implementation – Important coding segments with proper heading that you have been asked to do
  + Screenshots
  + Evaluation (Testing)
  + Conclusion
  + Appendix (if needed)

The cover sheet of your assignment should include the following information:

Informatics Institute of Technology

Department of Computing

Module: ECSC405 – Software Development Principles 02

Module Leader: Mr.Guganathan Poravi

Coursework

Date of submission: Please specify the date here

Student ID:

Student First Name:

Student Surname: