COE618 The Project

analysis/design/implementation/testing

Deadline: April 15, 2013, Monday.

Requirements

1. You must do this project in a group of 2 or 3 students.

2. A written **report** has to be generated per group. The report must be at least 4 pages long but no more than 6 pages (excluding the pages for the appendices). Use Times New Roman font size 12.

(a) You **must** include at least 2 appendices in the report:

   • Appendix 1: UML diagrams (4 kinds – **Use Case** Diagram(s), **Class** diagram(s), **Sequence** diagram(s) and,

   either Activity diagram(s) or State diagram(s))

   • Appendix 2: Javadoc for all the classes

(b) Your report **must** include the following 5 parts:

   • Problem description

   • Design:
   * Modules description and explain how these modules are decomposed.
   * Your project must include at least 8 classes. Write specifications for all the methods of any two classes.
   * Describe the UML diagrams that you have provided in Appendix 1
   * Include any techniques/principles/patterns that you have used in your design.

   • Testing: What testing technique have you used? Explain how did you test your classes.

   • Conclusion: What have you learned from the project?

   • How did you divide the work?

4. You **must** provide the names and student ids of group members in your report.

5. Your group may choose any suggested project or you may define your own.

6. All team members of a group will receive the same marks for their project.

7. You **must** give a demonstration of your project to the TA during your last lab session (i.e. in the week of April 8-). The demonstration should include successful compilation, execution and testing of your project application.

The report will be assessed not only on their technical or academic merit, but also on the communication skills of the author as exhibited through the report.

Cheating

- **No copying is permitted.** Cheating involves copying code or project from the web, other student's work, or projects of previous students, etc. The punishment for cheating is a zero in the project and will be subject to the university's academic dishonesty policy.

Suggested Topics

1. A travel agency sells journeys with various transportation vehicles like for instance auto bus, aeroplanes or ships to their customers. The same journeys can be in the system several times, but with different IDs. This happens for instance, if the demand for bus journeys is higher than the maximum number of participants. In such cases the contingent will be increased (new journey in the system with another bus). A specific journey can have only one transportation vehicle. For each journey exists a brochure, which is published in the various sales offices of the travel agency. The journey has a unique number and a description. Furthermore, the dates of arrival and departure and the maximum of participants are stored for each journey offer. Each journey belongs to one or more categories. There exist the following categories: adventure, beach, family, city tour and wellness. If a journey offer is fully booked, it will marked as full. In this case, no more bookings to this offer are possible. The travel agency has various offices: one central office and several subsidiaries. In the central office all categories are offered. The subsidiaries are motto orientated, that means that they only offer journeys from one specific category. In a city only one subsidiary of every category is allowed. Additionally to the offices, there exists a website, in which also journeys from all categories are offered. The price of a journey and the limit date of booking (last possible day for a booking) vary from the journey and the age of participants (children, students, adults). Some journeys have a minimum number of participants (modeling of booking cancellation is not required) or require group bookings (more than one person at one booking), e.g. family trips. Each customer has a customer card (with a unique customer number). Additionally, for every customer (also every fellow passenger) the name and the date of birth are stored in the system.

Booking: When booking a journey, it will be taken out from list of all journey offers. This is only possible, if a booking is possible (limit date not reached and journey offer not full). Then, the customer has to tell the number of participants in his group. Next, it will be checked, if this booking is possible (overbooking, group booking constraint). For calculating the price, the customer has to tell the age of each participant in his group. A journey booking can be paid with payment form, bank collection, cash card, credit card or cash (only at offices). After the price calculation, a new booking is possible. Each booking has a unique booking number. If no more bookings should be taken, the bookings are stored finally in the system and at the customer card and the bill(s) are printed out.

2. A Book Club is an online discount book club that enables students to purchase books on computers directly from the publisher, which makes their cost considerably less than their retail price. Students can purchase a book online by creating a club account without joining the club or by joining the club to save a great deal on purchasing a book at the member price, which is much lower than the full book-club price.

To join the club, the students must have valid ID Cards, live in Canada, and own Canada dollar credit cards. The club provides each member with an introductory offer to buy three books for 60 dollars plus shipping and handling charge, five dollars for each book. To maintain the membership, a member has to commit to buy three more books in the next two years. Upon failure to buy 6 books within 2 years, the member has to pay the full price for the three books that (s)he bought in the introductory offer.

The procedure for joining the club is really simple: A student makes selections (at least three books) from the online catalogue and review the items in the shopping cart; Fill out the membership form, which includes ID number, billing and shipping addresses, and credit card information; Click on the Submit button to join.

The book club allows its member to browse through the entire catalogue and make selections online. The club members can review their account information on the web. Each month, a club member receives via email an electronic booklet that includes all of the latest titles available from the book club with member prices. To order them, a member simply emails the Member Reply Form back on the marked date.

The members can cancel their membership by emails after purchasing six books within two years. A previous member can rejoin the club to take advantage of another introductory offer.

3. Graphs

A graph is a collection of nodes with edges between them. Every edge connects one node to one other node. There can be nodes without edges but no edges without nodes. A node may be connected to itself. There can be zero, one or more edges between a pair of nodes. Every edge has a label; distinct edges may have the same label.

Here are some examples of applications of graphs:

> • Create a website diagnostic tool that represents a website as a graph whose nodes are html documents and whose edges are links. The tool may examine the site for connectivity, find broken links, update all documents when a document is moved, and so on.

> • Create a curriculum design tool that uses a graph to show prerequisite relationships between courses, to find inconsistencies and determine feasible programs of study.

> • Create a program for generating driving directions that uses a graph to represent a street map, and computes a shortest path to find directions from one point to another.

A possible project would be to develop one of the above applications.

Ideas on graphs:

To give you some sense of the kinds of issues you should be considering in your design, here are some questions you might want to consider. These don't in general have simple answers. You'll need to exercise careful judgment, and think carefully about how decisions you make interfere with each other.

> • will the graph be mutable or immutable? will it be possible to change the label of an edge?

- will the graph allow edges without labels?

- will edge labels be strings or generic objects?

- will nodes be required only to satisfy the interface of java.lang.Object? or will you design a Java interface for nodes?

- will the graph be implemented as a single class, or will there be a separate Java interface for the Graph specification, and a class for the implementation?

- will edges be objects in their own right?

- will it be possible to find the successor of a node from the node alone, or will the graph be needed too? can a node belong to multiple graphs?

- should path-finding operations be included as methods of the graph, or should they be implemented in client code on top of the graph?

Submitting your project

You must submit your project electronically before the deadline as follows:
If you did the project on a Departmental computer in your coe618/project/ directory, then you can do the following:
```
cd coe618
zip -r project.zip project
submit coe618 project project.zip
```
If you did the lab on your own computer, zip the project folder (remember to do this recursively so that all sub-folders are
included), then transfer the zip file to a Departmental machine, logon to a Departmental machine which can be done remotely)
and type in the submit command:

```
submit coe618 project project.zip
```

There should be ONLY one submission per group. The **project.zip** file should contain the **report** and also the **implementation** of the project.