Indian Institute of Technology, Kharagpur

Department of Computer Science and Engineering

Assignment 1 - Java Programming, Spring 2013-14

Software Engineering (CS 29006)

Assignment Date: 09-Jan-2014
Submission Deadline: 23:55 hrs, 19-Jan-2014

Grading guidelines:

1. Zero marks for a submission if it does not pass the plagiarism test.
2. *Break-up of Credits will be as follows*:
   (a) Percentage of features implemented: 70%
   (b) Aesthetics: 10%
   (c) Whether reasonably able to answer questions: 20%.

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1. **Super Market:**
   A super market needs to develop the following software to encourage regular customers. A customer would first have to register for the scheme by supplying his/her residence address, telephone number, and driving license number. Each customer who registers for the scheme is assigned a unique customer number (CN) by the computer. A customer can present his CN to the check out staff when he makes any purchase. In this case, the value of his purchase is credited against his CN. Periodically, the supermarket intends to award surprise gifts to the customer who has made the highest total purchase for the considered period. Also, it intends to award a 22 caret gold coin to every customer whose purchase exceeded Rs.10,000. On request by the manager, the adress of the gold coin winner and the suprise gift winners should be displayed. [**10 Marks**]

2. **Snake and Ladder Game:**
   We need to develop a snake and ladder game with the following features:

   - The board locations are numbered consecutively: 1,2,3,... The board size for a game and the snake and ladder positions on the board should be configurable. A default board of size 8 by 8 squares and predefined snake and ladder positions should come up as long as the user does not specifically configure the board. During configuration, if a user selects a board with any dimension less than 5 and more than 12, it should not be allowed.
   - Upto three different players can play the game at the same time.
   - When the game is started, each player should be asked to enter his name. Once a player enters his name, he is assigned a unique color with his board position would be marked. After the game start button is pressed, each player should be prompted to roll a dice. As soon as a player rolls the dice (possibly through a mouse click or key press), a random number between 1 and 6 should be generated and displayed. The player's position of the board should be incremented by that many locations on the board and displayed. Each player's occupation of a position should be indicated by the color assigned to him.
   - The different players should be asked to roll the dice in turn, until any player reaches the final position.

- A snake can take a player's position down by several squares, if he lands at (not passes through) a snake's mouth. In this case, a message "Snake at board position x got you!" should be printed.
- A ladder can take a player up if he lands at the base of a ladder. In this case, a message "You are up through ladder at position x!" should be displayed."
- As soon as the player reaches the final position a congratulation message should be displayed and the number of steps (dice roll attempts) he has taken is displayed. This is his score in the game.
- If a player betters his past highest score, a congratulatory message to this effect is displayed along with his past highest score for information.

The following must be considered:

(a) The game should be developed with a friendly and attractive interface for school children (Use Swing). **[20 Marks]**

(b) A Web-enabled version is required, where the game can be downloaded on a browser as an applet and played. **[10 Marks]**

3. **IIT academic course management software:**
IIT needs a software to automate its grading and student registration procedure.

The following are the main features of the software:

- Entering of the details of courses that a student has to do in each semester.
- Initial Student registration
- Student registration for a semester
- Grade entry by a teacher
- Semester tailoring by faculty adviser
- Display of grade sheet

Entering Course Details: A nominee of the Dean should enter the details of the course (such as course name, credits, etc.) that students need to do in a semester. A course can be core (compulsory) or elective. The nominee should also indicate the number of elective course to be done out of the total number of electives being offered.

Initial Student registration: When a student selects initial registration option, he should be asked to enter his roll number, name, address, etc. A roll number for the student should be generated. The roll numbers of the student should be consecutive.

Student registration for a semester: Once the student enters his valid roll number, he is displayed a set of core courses and a set of electives. He should be asked to select only the specified number of electives.

Grade entry by a teacher: A teacher can see the names and roll numbers of the students enrolled in his course and enter letter grades for them.

Display of grade sheet: Selecting this option would ask the roll number of a student and display the details of his grades in the various courses he credited during the semester. It should also compute the GPA using the IIT grading system and display his GPA. If his grade is below 6, a highlighted warning message should be displayed. If his GPA is above 9, a congratulatory message should be displayed. Once, the software is put to field use a print option would later be incorporated to print the grade sheets.

The software should preferably have login protection for various users. The GUI should be attractively and choice-fully designed. **[20 Marks]**