COMP3297 Introduction to Software Engineering
Department of Computer Science
The University of Hong Kong

PROJECT DESCRIPTION:
Tutoria, a tutor brokering platform

Introduction:

Your client is MyTutors, a Hong Kong-based company specialising in online educational support systems. MyTutors has partnered with the University of Hong Kong (HKU) to develop and roll out a limited-scale version of a tutor brokering platform for evaluation at HKU. The company's future plans are to further develop the system to cover all programmes at HKU, and then seek to establish similar partnerships and extend coverage to other universities in Hong Kong.

HKU's goal is to improve student access to one-on-one, on-campus tutoring. The current Teaching Assistant (TA) system for individual courses is limited in that TAs have very few scheduled consultation hours and, at busy times, students may need to wait a long time while the TA deals with other students. Private tutoring is already available at HKU, often offered by graduate students and advanced undergraduates, however there is no straightforward, fast method to find and compare such tutors. The university wants to provide more immediate, short-term support for students who are encountering difficulties in their courses. It will employ full-time tutors on contract to provide such help but, acknowledging that this alone will not be sufficient, it also wants to help students find and use quality private tutors at HKU.

MyTutors will develop the Tutoria platform to help students find good tutors and to book sessions with them up to a week in advance. Contracted tutors employed by HKU will also use the platform to manage their bookings. Contracted tutors' services are free but their timeslots get booked up quickly and many students find private tutoring more convenient. For private tutors, Tutoria will also manage marketing and handle the payment process for tutorial sessions.

HKU will provide links to Tutoria from its portal and from Moodle course pages. MyTutors will not charge universities for Tutoria. It will derive revenue by taking a small commission, charged to students, on each private tutorial timeslot transaction.

MyTutors has a small number of in-house developers and technical support staff, however their time is currently fully committed to establishing the server infrastructure and to developing payment gateways for Tutoria. The company is seeking to contract an outside team to develop a pilot version of Tutoria for HKU.

Your role:

You are an undergraduate of HKU. Together with a group of colleagues you have formed a software development company. In part because of your excellent knowledge of HKU you have been offered the contract to develop Tutoria. This is your first contract since forming your company.

Your principal contact at MyTutors is Mr. Paul Chan, Chief Technology Officer. We expect you to deal with him in a professional manner throughout the project and this will contribute to your grade. You may contact Mr. Chan at: paulchan1116@gmail.com.

In common with the majority of real-world clients, Mr. Chan has many demanding responsibilities and won't respond well to open-ended questions that require long, detailed answers. For example, to ask: "Please summarize your requirements for Tutoria" would be unacceptable. Likewise, clients don't like to receive large numbers of questions. Aim to act professionally - respect your client's time and make good use of any scheduled contact you have with him.

Details obtained from initial interviews:

MyTutors' business analysts have already conducted interviews with key stakeholders and have elicited the following preliminary project details:

a) User needs

Users (that is, both students and tutors) want to:

- register with Tutoria, specifying a username and password for subsequent authentication;
- specify a name, contact email address and a contact phone number;
- upload an image as their Tutoria avatar;
- change email address, password or any other modifiable personal details supplied during registration;
- retain access to their account if they forget their password;
- maintain a wallet from which payments for tutorial sessions are made (students) and to which payments for sessions are received (tutors);
- view a transaction history for their wallet for the past 30 days displaying the date, the amount of the transaction and, for outgoing or incoming payments for tutorials, the name of the other party involved;
- view details of all their upcoming tutorial sessions booked for the next seven days.

b) Tutor needs

Tutors want to:

- register as a tutor and specify whether they are a contracted or private tutor;
- specify their university and the codes of courses they will tutor at that university;
- tag their profile with general subjects they can tutor (examples: Java Programming, Computer Graphics, Software Design, ...);
- specify an hourly rate if they are not a contracted tutor;
- black out timeslots for which they are not available during the current and the following week;
- provide a short introduction/biography that will display to prospective students as part of their tutor profile;
- activate or deactivate their profile for display to prospective students. That is, control whether or not their profile will appear in search results when students are seeking a tutor;
- view the status of their timeslots for the current and next week;
- receive email notification when a timeslot is booked for a tutorial session by a student;
- receive payments for tutorial sessions promptly following their completion;
- prevent students from cancelling sessions less than 24 hours from the scheduled start time;
- send and receive messages to/from students;
- receive notification when a payment is made to their wallet;
- transfer money from their wallet to a bank account, etc. (simulated as a simple withdrawal – see (f) below).

c) Student needs

Students want to:

- register as a student;
- search for tutors, specifying any or none of the following: university, university course, subject tag, hourly price range, whether tutor is contracted or private, and whether to show all tutors who satisfy the criteria or only tutors with at least one available timeslot in the next 7 days;
- search for a tutor by family name or given name(s);
- view short profiles of tutors that meet their specifications (or of all tutors if no criteria were specified). A short profile should show: name, avatar, university, hourly rate, average review from students if available, and subject tags;
- sort search results to view tutor profiles ordered by hourly rate or average review score;
- navigate from a tutor's short profile to view a detailed profile of the tutor. Detailed profiles should show all details shown in the short profile plus the tutor's introduction/biography, availability, reviews from previous students, and provide a means to send a message to the tutor;
- view a tutor's available timeslots;
- select an available timeslot of a tutor and book it for a tutorial session;
- cancel a session;
- submit a review of the tutor after a tutorial session and choose whether this should be anonymous or whether their name may be revealed with the review;
- send and receive messages to/from tutors;
- add money to their wallet (simulated as a simple deposit – see (f) below);
- use coupon codes issued by MyTutors to obtain a discount on tutorial services;
- receive a notification when they have booked or cancelled a session successfully and money has been moved to or from their wallet accordingly.

d) MyTutors needs

The company wants to:

- deploy, as a first version of Tutoria, a pilot system of limited scale to prove the concept. This first version will cover only courses and general subjects taught in the Department of Computer Science at HKU;
- receive a commission on payments for sessions;
- offer occasional time-limited discount coupon codes as a marketing tool to encourage students to use Tutoria;
- transfer money from their wallet to a bank account, etc. (simulated as a simple withdrawal – see (f) below).

e) Administrator needs

Administrators want to:

- control access to Tutoria through user authentication based on username and password;
- send mail to the user containing a token for password reset after receiving a lost password request;
- specify the list of valid course codes for a university.

f) MyTutors in-house developer needs

In-house developers want to:

- have Tutoria delivered to MyTutors with a simple simulation in place of payment gateways. Gateways are currently being implemented and tested by the in-house team and they will be added to the delivered system later. Your responsibility is only to provide a system of internal wallets and a simple interface to support demos and testing. Through the interface, students may deposit funds in their wallets and tutors and MyTutors may remove funds from their wallets. The interface and wallet mechanism will be replaced later by credit card, PayPal, Venmo, direct bank debit/credit, and other gateways.

g) Details of additional business rules and other information

Students and Tutors:

- usernames must be unique;
- a user can register as a student, as a tutor, or as both;
- a user registered as both student and tutor cannot book one of their own timeslots for a session;
- tutors can serve only a single university. All tutorial sessions are expected to take place at that university's main campus;
- hourly rates must be multiples of HK$10;
- hourly rates for all contracted tutors must be HK$0. Contracted tutors are paid a salary by the university and do not charge for services;
- tutors' and students' contact phone numbers are revealed to the other party only when a timeslot is booked;
- search for tutors will show only those tutors, if any, that satisfy *all* criteria specified by the student.

Tutorial Sessions, Timeslots, and Payments:

- students can view the status of tutors' timeslots only for the next seven days;
- for regular tutors, timeslots are in units of one hour and begin on the hour;
- for contracted tutors, timeslots are in units of half an hour and begin on the hour and on the half hour;
- to ensure fair access, students are permitted to book a maximum of one timeslot for any particular tutor in any single day. Thus all sessions for regular tutors are for one hour. All sessions for contracted tutors are for half an hour;
- students may cancel a session up until 24 hours before its start time and receive a refund of their payment for that session;
- tutors cannot black out timeslots that have already been booked;
- blacked-out timeslots cannot be booked by students for tutorial sessions;
- if a student attempts to book a timeslot without having sufficient funds in their wallet to cover the tutor's fee plus MyTutors' commission, then the booking is rejected.
- funds to cover payment for a tutorial session (including commission) are withdrawn from the student's wallet at the time of booking and held by the company pending completion of the session;
- unless a session is cancelled by the student, the tutor's fee is deposited in the tutor's wallet and the commission is deposited in MyTutors' wallet at the end of the session;
- in future releases of Tutoria, fee payments will be deposited in tutors' wallets only after students confirm they were satisfied with the tutorial, otherwise fees and commission will be credited back to the student's wallet. This functionality will not be offered in the pilot system.

Course codes:

- course codes specified by tutors must be listed in the relevant university's catalogue.
- in the case of courses with multiple offerings and, hence, multiple sub-classes, the sub-class identifier will be omitted from the course code (for example, COMP3297 will be used as a single course code rather than both COMP3297A and COMP3297B).

Commissions:

- MyTutors charges a commission of 5%. So, if a tutor sets an hourly rate of HK$100, the student is charged HK$105 for a one hour session of which HK$100 goes to the tutor and HK$5 goes to MyTutors;

Coupon codes

- coupon codes are issued periodically and passed to the university to be made available to students;
- if a valid code is entered by a student when booking a timeslot the student will receive a small discount. The discount is simply the commission normally charged by MyTutors. When a coupon is used, MyTutors does not charge a commission and, therefore, the student pays only the tutor's fee for the session.
- coupon codes have a start date and an end date between which they are valid. A code is invalid before its start date and after its end date;

Tags:

- a tag is any short term that a tutor feels is a good description of a general subject area in which they have expertise and that will be of interest to prospective students.

Reviews:

- after a tutorial session is complete, the student will receive an invitation to submit a review of the tutor;
- reviews use a six-level star rating system. Students can award the tutor a number of stars from zero to five, where zero is the lowest possible rating (completely dissatisfied) and five stars is the highest (completely satisfied). Students may also add text comments if they wish;
- a tutor's average star rating is calculated as the simple average of all ratings submitted for the tutor's sessions;
- the average rating is not displayed in a tutor's short profile until at least 3 reviews have been submitted;
- all reviews, even if there are fewer than 3, can be viewed in a tutor's detailed profile.

h) Technical and other constraints

- Tutoria will be implemented in Python on Django;
- for this first release it will be sufficient to implement on the Django default development server. For simplification, you can also use this server with Django defaults to serve static files on the understanding that it is not a real production-strength option. For production, we would deploy them to a static file server or cloud service;
- Tutoria will be built with SQLite as its DBMS;

- as part of various of its services, Tutoria is required to send mail to tutors and students. Again, for convenience of testing and demos, it will be sufficient to configure Django to redirect all emails to the console or to a file backend.

i) Assumptions

- You may assume you are free to use any of Django's built-in resources and third-party applications to implement Tutoria. In fact, you are encouraged to do so.
- You may assume that tutors always attend their tutorial sessions. In practice, if a tutor is absent and the student informs the company, then all payments are credited back to the student's wallet manually.