Inf 43 – Fall Quarter, 2015 – Homework 1

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Awarded Points	Maximum Points	Document Aspect
	15	Clarity of writing (spelling, grammar, sentence construction) and Clarity of expression (flow, structure, making logical arguments). Roughly 7.5 each.
	15	Introduction / Executive Summary (can be different sections or combined into one)
	7.5	Application Context / Environmental Constraints (can be different sections or combined into one)
	35	Functional Requirements, including use-case diagram and each use case (following a use-case template).
	7.5	Software Qualities and Non-functional Requirements
	5 (+5)	Other Requirements and Other Items. At least a Glossary of Terms. You can earn up to 5 points Extra Credit if you go beyond Glossary
	7.5	Assumptions / Risks (can be different sections or combined into one)
	7.5	Priorities / Implementation Phases; Future Directions and Expected Changes
	100	**TOTAL**

PrivatePractice System Requirements

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Introduction

PrivatePractice is a web-based system to be created for use by the outpatient department of the Irvine General hospital. It is being made to help alleviate the complications of the current paper-based medical records and appointment-setting systems by digitizing the entire process.

Oliande, LLC is under contract to engineer and maintain PrivatePractice. This requirements document will outline all of the functionality, qualities, and necessities that describe the web-portal based system. The document is outlined as follows:

Overview / Executive Summary

At the present time, all patient medical records are stored on paper and handled by administrators. With the large amount of patients the outpatient department treats, it has proven difficult to maintain an organized records system. PrivatePractice solves this issue by creating an Electronic Medical Record system that can easily be accessed by the computers with internet connection in the hospital. The system will store information on

each patient such as their medical history, symptoms and ailments that caused them to see a doctor, the procedures and tests the doctor performed on them, as well as the prescription the doctor prescribed the patient. At the end of the visit, the system is able to send the prescribed medication to either a pharmacy in the hospital or the patient's preferred pharmacy.

In addition to an Electronic Medical Records System, PrivatePractice also includes a second, web-based appointment-setting system that helps patients schedule appointments with their preferred physicians online. The appointment system allows the user to change and cancel an appointment as well. Once the patient is finished with their appointment, the system will send information to the billing department of the hospital so the patient can be billed accordingly.

The two systems will digitize the majority of the work hospital 's outpatient department staff does from the moment the patient schedules an appointment to the moment the patient walks out of the hospital.

Application Context / Environmental Constraints

The Electronic Medical Records part of the PrivatePractice system will only run on the desktop computers currently in the hospital which run Windows 7. The system will not be taxing on the hardware in the office. The Appointment part of the system will be able to be accessed by the patients from any electronic device with internet access. Both are web-based, and will be expected to run on all of today's popular internet browsers including Google Chrome, Mozilla Firefox, Internet Explorer, and Opera. The target audience for the system is not expected to have technological expertise; just basic computing skills. There are no current design restraints in place for the User Interface, it will be designed with simplicity and intuitive ease of use in mind.

Functional Requirements

This section goes into detail about every use case each user of the system might perform. It should be noted that the two “sub-systems”, the Electronic Medical Record system and the Appointment system are just parts of one main system, Private Practice; however, both sub-systems might require certain actions (such as logging into one system instead of the other) that are very similar. There will not be two use cases for these situations, instead the use case will note that it applies to both sub-systems and describe the action for both of them. The use case diagram on the following page outlines each use case along with the user who is expected to perform the use case.

Use Case Diagram for PrivatePractice

Log In

Basic Flow: Users enter this unique ID and password, once the system verifies that they provided the correct information, they are logged into the system.

Alternative Flow: User enters invalid information, and the system will alert them to enter correct information, along with provided them the ability to have their password emailed to them if they forgot. The system will then email them their password so that they can log in successfully.

Exception Flow: The user forgets all of their information and cannot access their email to retrieve their password, the user will need to see an administrator who will provide them with the correct information.

*Note: This applies to both the Appointment and Electronic Medical Records sub-systems.

Log Out

Basic Flow: Users may choose to log out of the system at any time by clicking the "log out" button. Once this is done they will no longer have access to the system and will be brought back to the log in interface.

Alternative Flow: User forgets to log out, and once the system is alerted that the user is no longer accessing the system (for example, if the user closed their web browser), the user will be logged out automatically.

*Note: This applies to both the Appointment and Electronic Medical Records sub-systems.

Delete Account

Basic Flow: If for some reason the patient's records are requested to be deleted (for example, if the patient has died), the user can choose to permanently delete a patient out of the system by clicking "delete account", which erases any mark of patient records and appointments from the system.

*Note: This applies to both the Appointment and Electronic Medical Records sub-systems.

Register Account

Basic Flow: When a new patient is to be entered into the system, user creates an account on the system with a unique ID and password, the user stores basic information about the patient such as name, age, gender, height, emergency contacts, phone number, address, and social security number.

Alternative Flow: User tries to create an account with an ID that is already in use. The account is not created and the user is prompted to enter a unique ID again. The user will then enter a unique ID, creating an account.

*Note: This applies to both the Appointment and Electronic Medical Records sub-systems. For the appointment system, the patient will need to walk up to the front desk and ask an administrator to create an account for them.

Make Appointment

Basic Flow: User is presented with a list of available doctors and appointment times. User selects which doctor and what time they would like to schedule an appointment for. That time slot with that specific doctor is then made unavailable to be scheduled by another user.

Alternative Flow: User tries to select a doctor/appointment combination that has already been scheduled by somebody else. They are presented with an error message and are told to select an appointment that is available to them. The user can then choose a correct appointment time and the appointment will be scheduled.

Exception Flow: There are no available appointment times. In this case the outpatient department cannot accommodate any more patients and no further appointments may be scheduled.

Change Appointment

Basic Flow: User is able to change a currently scheduled appointment to another appointment time. The appointment that was previously scheduled is now free to be made for another patient and the time/doctor slot that the appointment was changed to is now unavailable to other users.

Alternative Flow: User tries to change an appointment to a time that is already scheduled by somebody else. They are presented with an error message and told to select an appointment that is available to them. They are then forced to select an available appointment time and that appointment will be the one scheduled.

Exception Flow: There are no available appointment times to change the appointment to. In this case the user can only cancel the appointment and they will be given the option to do so.

Cancel Appointment

Basic Flow: User is alerted that the patient will no longer be able to make it to their appointment. The user may cancel the appointment which will then free up that time slot so new appointments can be made in its place.

Store Medical Records

Basic Flow: During an appointment with a doctor the user can input information into a patient's medical record such as symptoms the patient is experiencing, treatments the doctor performed, information from past visits with a doctor (if any) as well as medications prescribed if they have the correct permissions.

Exception Flow: Unauthorized user tries to access medical records to input information, the system does not allow them to access this functionality.

View Medical Records

Basic Flow: Users are required to first log into the system with an account that has the correct permissions to view the medical records. Once this is done, they are able

to see medical records that include symptoms the patient is experiencing, treatments the doctor performed, information from past visits with a doctor (if any) as well as medications prescribed.

Exception Flow: Unauthorized user tries to access medical records and are told they have not been granted permission to view medical records. They will be unable to see the medical records.

Edit Medical Records

Basic Flow: Users with the correct permission may edit any current medical records. Once this is done, the record that was done before the edit is removed from the system and the new edited version is stored in its place.

Exception Flow: Unauthorized user tries to edit a patient's medical record. They are told they have not been granted permission to do so and are unable to access the records to edit.

Print Invoice

Basic Flow: The system calculates the time a patient has spent with a doctor in 30 minute intervals. The user then chooses to print this invoice out. The system then sends this information to a printer and the invoice is printed.

Exception Flow: There is a malfunction with the printer. The invoice is not printed.

Send Prescription

Basic Flow: Once medication has been prescribed, the user can choose whether to send it to a pharmacy in the hospital or a pharmacy outside of the hospital. The system then sends the prescription to the chosen pharmacy.

Send Invoice

Basic Flow: The system calculates the time a patient has spent with a doctor in 30 minute intervals. The user then chooses whether or not they wish to print this invoice out. The system then sends this information to the billing department in the hospital who handles the charging of patients.

Alternative Flow: The patient did not make their scheduled appointment. The system still bills them for the minimum amount of time (30 minutes) an appointment can take. The system sends this information to the billing department of the hospital who handles the charging of patients.

Print Medical Records

Basic Flow: Users are required to have the correct permission to print medical records. Once it is verified that they have these permissions, they are allowed to select which part of a patient's medical records they would like to print. The system then sends these records to a printer which prints them out.

Exception Flow: User does not have the correct permission to print the medical records. They are unable to do so.

Change Patient Information

Basic Flow: Users are required to have the correct permission to change patient information. Once it is verified that they have these permissions, they are allowed to change whatever they would like in the patient's information. These changes are logged into a database.

Exception Flow: User with incorrect permission tries to change patient information. They are not allowed to do so.

Software Qualities and Non-functional Requirements

Usability – Above all, the system should be easy to learn with no training required and easy to use by all parties who use it.
Security – As we are dealing with patient's private information, the need to keep their information private is of utmost importance to the software. It goes far in making sure only people with the correct permission are able to view private patient information.
Sustainability – The system is meant to replace the decade old system of paper-based records and appointments with an electronic version. It should be expected to last just as long, if not longer than the past system.
Back-Up System – As the system deals with an entire hospital's outpatient department's clients, it is necessary to have a back up of every patient's information in case the system breaks down.

Other Requirements

Glossary of Terms:

EMR – Electronic Medical Record
Oliande LLC – The company being employed by Irvine General to create PrivatePractice
PrivatePractice – The name of the EMR and appointment system being developed for Irvine General
Sub-System – During the client interview the client specified that there were to be two systems, an EMR system and an appointment system. This document combines them into two parts (“sub-systems”) of one system – PrivatePractice
Web Portal – A web-based application

Assumptions / Risks

The two systems assume the user has basic technological proficiency such as knowing how to access the internet and entering information into forms. Every member of the outpatient department's staff is assumed to have these skills; however, if the patient is

someone such as a young child who does not know how to perform these tasks an administrator or the patient's legal guardian will be able to access their account and schedule appointments for them.

A main concern of the system is that there is a possibility for patient-doctor confidentiality to be breached. For example, administrators are not allowed to view the patient's medical records; but, they are allowed to print them out. The administrators are under an oath to not break doctor-patient confidentiality and should ethically make the decision to not look at the medical records when they print them out. Similarly, pharmacists can view the medical records but they should be keeping the information they see private by the same argument. The risk that they might not uphold their oaths is still present.

There also exists the risk that the patient may be prescribed two medications that negatively interact with each other. The system does not alert anyone if this occurs. It is assumed that the doctors and pharmacists of the outpatient department will be able to catch the error without the help of a computer system.

Another concern is that in the first iteration of the systems there will be little thought on security based on time constraints. The system may be vulnerable to attack by an outside party who may be able to gain access to a patient's private information such as their address, social security number, as well as their confidential medical records. Future versions of the system will address this issue.

Priorities / Implementation Phases

Must Have:

-A web portal to host the EMR and Appointment systems.

-The ability for patients to make an appointment with their preferred physician online.

-The ability to store medical records on the EMR system.

Should Have:

-A way for users to access the system if they forget their login information

-A way for the two sub-systems to communicate the unique patient ID of each patient.

Nice to Have:

-Security measures in place in case there is “suspicious” activity

-A back up system in place in case the system experiences a crash and loses stored data

Future Directions and Expected Changes

Currently, the systems are only meant to be used by one hospital's outpatient department. Irvine General manages many other hospitals. Keeping this in mind, in the future the system may possibly be used by other departments as well as other hospitals once the system expands.

At the current time, the only computers allowed to access the systems are the Windows 7 desktop computers in the hospital. Future iterations of the systems will expand this accessibility in order to allow hospital staff to access the systems with their mobile devices as well as any other device with internet connection such as laptops they bring from home or tablets.

To address the concern of the vulnerabilities of the electronic medical records system, future versions are expected to provide security measures in order to make access to the records by anyone who does not have the correct permissions near impossible.

As of now, the system only sends an invoice to the billing department, who then handles the billing separately from the system. In future iterations it is expected that the system will integrate the billing process its functionality.