Online Ticket System

BSc (Hons) Computer science

Module: 3

Module Co-ordinator: Ahmad Alam​

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Content table:

Introduction:

This report will outline a system project for local trains that allows users to book local train tickets and get ticket receipt online.

Formal requirements methodologies:

There are various strategies for software development, the main two being the traditional ‘waterfall’ method and an ‘agile’ approach to development strategies.

Given that the online ticketing app is a reasonably simple system in its design and implementation and will need to be improved with changing user requirements, it was decided that a partial implementation of agile approach methodology would be best. This is due to agile approach focusing namely on iterative development and reducing chances of large costs that may incur if change was made later in the development in a waterfall model. Agile is responsive to change in customer requirements and allows for return to previous stages throughout the development process (McCormick, 2012). Agile is well suited for small groups and the development team for this project consists of less than 5 members.

The traditional waterfall methodology follows a ‘one phase’ and ‘set-in-stone’ approach which means that once decisions have been made in the initial stage, there is no turning back or else the organisation will incur high costs to do so (McCormick, 2012). This approach requires the team to spend a considerable amount on each stage before moving on and that bugs are corrected in advance. Meanwhile, in agile methodologies, less focus is given to documentation and more is given to ensuring the deliverability of working software. (Somerville, 2016). The stakeholders are provided demonstrations of the program at the end of each iteration and their feedback and response is used and implemented for changes in the following iteration. This process is repeated/iterative cycle continues till the product delivered meets user/customer expectations. It was found that agile to be more efficient than waterfall due to its adaptability to the real world. It is easier to make last minute amendments to the requirements or design (McCormick, 2012).

The project will not be fully agile, however, only the software will be based on agile prototyping to revisit the user base but once the requirements are fixed, the rest of the project will be completed following the waterfall method as it is unlikely that there will be any changes for rest of the project.

Requirements analysis is a process used to meet the demands and expectations of a new product. It involves communication with the stakeholders to define expectations, and document all the key requirements that are required by the product end user such as consumers. This also aims to recognise the user requirements, system requirements and functional and non-functional requirements for the ticketing system app.

User requirements:

Secure login function: this ensure that only authorised users can log in to make a reservation this will include the admin access to train officials.

Train reservation: this will allow authorized user to make a reservation on a train journey. Reservations can normally be made well in advance, and remain available until two hours before the train starts its journey,

Pay function: this will allow users to pay with various payment method which includes credit/debit cards, PayPal and cashapp this will also Accept checks or cash by setting up offline payment options in addition to online payment.

Admin access function: this will allow only admin users to make changes in trains destination etc, this will also include extra function called Role-based access control (RBAC).

System requirements:

Workstation which includes CPU, monitors and secure internet connection and a secure database is required.

Non-functional:

these are the system attributes such as usability, security etc.

Use of encryption to avoid bots from booking tickets.

Should accept different payment methods.

Should include security feature in form of username and password to protect user data.

this system will have quick response rate alongside user friendly interface.

Functional: functions/feature a product must have for users to be able to accomplish their task / work.

Booking system needs to be associated with a single account.

Booking confirmation and receipt should be sent to user for them to show it to staff member.

Booking system should only allow users to book trains when they are available.

The second phase for online ticketing system is analysis phase. Software engineers work with a range of system stakeholders which include managers and any end users of the product to find out about the application domain, the services that the system should provide, and the performance of the system. This process is mainly divided into 4 important points which are discovery, classification and organization negotiation and specification. One main problem with software elicitation is that most stakeholders do not know what they want, or they may have conflicting requirements which makes it impossible for developers to understand the user requirements therefore requirements gathering method is used to make sure end users’ requirements are met. These include group interviews and questionnaires/surveys.

Group interviews: for requirements gathering of project, it was found that group interviews are better than 1-1 interviews as it saves a lot of time therefore able to get opinion of more stakeholders in short amount of time. These can also be used to add new concept / ideas for the online train ticketing system. The discussions in focus groups are relaxed, and often participants enjoy sharing their ideas and perceptions. (Krueger and Casey 2009) suggesting that stakeholders will be more willing to give their opinions and therefore means less conflicts between stakeholders.

Online Questionnaires/Surveys: for our requirements gathering ,group decided to use online questionnaires to collect information from many stakeholders in relatively short amount of time or for the people who weren’t available to do group interviews ,as a railway organization is likely to have thousands of stakeholders which will include it will be easier and cost effective to get their input using questionnaires/surveys for system requirements furthermore According to BBP Learning Media (2009, p.76), ‘the questionnaire is the primary tool of marketing research, a device for delivering questions to respondents and recording their answers’

Possible risk

Ethical/social issues with gathering : one main ethical issue with focus group that doesn’t exist in one to one interview is that some participants may not be able to voice their opinion freely this applies to people with introvert personality therefore they may not feel comfortable giving their opinion in group setting which will mean the information that is obtained is not representative and therefore the investment may get wasted however one way to overcome this is to do anonymous online questionnaire therefore meaning that people will be comfortable to give their opinion furthermore moderator bias also exist in focus group They may, intentionally inject their personal biases into the participants' exchange of ideas which may affect the requirements gathering of a system which may lead to invalid results and waste of investment.

One issue with using online questionnaire is that it may not be representative as someone with disability May not be able to fill in the online questionnaire due to various reasons which may lead to inaccurate gathering , furthermore elderly may find hard to use devices such as laptop to fill in the questionnaire which may mean it isn’t representative of organization as elderly people aren’t included which may lead to waste of investment /one way to overcome this is to offer one to one interviews with people who are disable or elderly to get the requirements gathering therefore making the sample more representative.

legal requirements for Smart tickets:

Smart ticketing app is required to comply with laws and regulation. These include organization policy, protecting personal data, Accessibility and right of users to grant consent for using their personal data which may include name address etc.

Accessibility: this means that website should be accessible to everyone who wants to use it this is included in equality act 2010 as it is an online website app therefore it complies with Web Content Accessibility Guidelines (known as WCAG) this makes sure that our web page app is accessible to people who are blind and have any mobility issue or have any problem relating to thinking and understanding.

Right of users: this includes General Data Protection Regulation (GDPR) which means that organization is only collecting data that is required furthermore it also makes it easier for user to withdraw their consent. this also includes notifying user that app uses cookies.

protecting personal data: This comes under GDPR which means smart ticketing app takes necessary action to prevent data from being stolen, therefore organization will use SSL certificate for encryption of personal data furthermore software will be updated regularly to make sure data is not stolen.

User acceptance testing:

This is the last phase of software life development cycle which verifies if the product is fit for the intended purpose.in this phase stakeholders or end users will use the product, checking if it works as expected and try to detect any errors or bugs that were not identified by the developers. This is also known as beta testing.

security testing: as ticketing system will use internal and external database it is really important that information is protected at all times therefore different methodologies will be used to make sure data is protected which include security scanning which will provide system weakness and later provide solutions to reduce these security risks one another way data could be protected is by using Penetration testing which simulates an attack from a malicious hacker and which makes sure database is protected from external attacks

access control: as for our user requirements it is required that admins are able to log in and make changes therefore access control test would be required Access control identifies users by verifying various login credentials this will include different testing methods such as different pins, passwords and username. This will be done to make sure that unauthorized user does not have access to main database furthermore this will also include use of Role-based access control (RBAC) which will mean users will access data that’s been deemed necessary for their role within the organizations for example staff member will not have access to the stored data of customers such as their bank details etc.

FLOWCHART EXPLANATION:

• Check whether the device is connected to the internet, if not then message “NO INTERNET CONNECTION” is displayed

• Once departure station was entered check whether this station exists, if not user is asked to try again

• Once arrival station is entered, check whether is exists and if not, user is asked to try again

• If the journey requires change of trains every train that has to be taken is displayed with all the prices and if it doesn`t then the cost of one train is displayed

• If user wants to buy tickets for more than one person then he should enter the amount of people he is buying tickets for

• The total price of the journey for all the people is then displayed

• If another journey is to be added then user goes back to entering departure and arrival stations and everything starts over

• The total price of all the journeys for all the people is displayed

• Personal details, such as email that the tickets will be sent to and billing address are to be entered

• Bank details are entered

• If bank details aren`t OK, the message “ERROR IN BANK DETAILS” is displayed and if they are then the balance is checked

• IF user has enough money on balance, he is getting charged the cost of all the tickets

• The tickets are displayed on screen and sent on user`s email

UML explanation

• Journey is a bit that consists of its own id, the departure and destination, the price and the number of tickets needed. Departure and destination are strings and user inputs them himself then with check Journey method they are checked and if these stations exist, journey price is being set. When the user is asked to enter the amount of people, he is buying the tickets to, journey amount is updated, and the price is multiplied by it.

• Order consists of its id that might be needed in future for billing, array of journey id`s an email and billing address. It also has got Total Price method that sums the prices based on all the journey id`s.

Payment takes card information, checks it and then charges the card and sends all the tickets on email that is kept in Order using charge Total Price method.

team working strategy.

It is crutial that development projects ensure a successful strategy for team working is devised early on as many issues can arise from not prioritising this, such as a lack of engagement between team members, lack of communication, poor management, not working in the same direction or towards the same vision and, worse, tension and conflict (Flint, 2016). This can lead to projects taking longer than necessary. Team members are the projects greatest asset and the organisation of the group directly affects the decisions that are made by the group with regards to the interactions and exchange of information between the stakeholders and the group (Why Are Employees The Most Valuable Intangible Assets? 2020). For this reason, it was important to ensure that at the start of the project, the strengths and weaknesses of the members were highlighted so that the suitable tasks were delegated to them based on their skills. The team acted as more of an informal group where, despite there being an assigned team leader for tasks such as making sure the members are on track, and dealing with the external interface, the group acted mainly as a whole when it came to a consensus on the decisions affecting the project and everyone’s opinion was taken into consideration. The group was small, with few individuals working together throughout the development process and so members introduced themselves to each other and built trust by voicing their concerns, fears early on making them able to communicate easily throughout the project and understand one another. Regular one to ones were scheduled between the team leader and team members to ensure everyone understood what they were doing correctly or if there were any concerns. Throughout the development process, group members had regular meetings to give feedback on each stage, ensuring regular communication and keeping each other updated so that the group members are working in the same direction. Each day, clear goals were outline for what required from members to do that day and deadlines were set. This helped ensure the project was done in time and that deadlines were met. Overall project goals were also set in a similar manner. By doing this, the group was able to avoid issues throughout the project and was well managed and orderly.

Conclusion:

Overall, the aims and objectives were achieved. This was done through consistence team efforts and consistence approach was taken to design and implement the smart ticketing system therefore allowing users to book local train tickets easily via app, which is implemented with secure payments system to build trust between organization and consumers. To conclude we believe that we have achieved all the requirements which were required by the user and therefore we believe we have produced a successful system.

References

Sommerville, I., 2016. *Software Engineering*. 10th ed. Old Tappan: Pearson Education UK. [Accessed 25 February 2021].

McCormick, M., 2012. Waterfall vs Agile Methodology. [ebook] Available at: <http://www.mccormickpcs.com/images/Waterfall\_vs\_Agile\_Methodology.pdf> [Accessed 25 February 2021].

<https://www.umsl.edu/~sauterv/analysis/F2015/Requirement%20Gathering%20Methods.html.htm>[Accessed 23 February 2021].

<https://howandwhat.net/advantages-disadvantages-questionnaires/>[Accessed 25 February 2021].

BPP Learning Media (2009) Marketing, London: BPP Learning Media[Accessed 22 February 2021].

Flint, M., 2016. 10 common problems project teams face. [Blog] Available at: <https://www.apm.org.uk/blog/10-common-problems-project-teams-face/> [Accessed 25 February 2021].

<https://go.gale.com/ps/anonymous?id=GALE%7CA433119564&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=10920811&p=AONE&sw=w>[Accessed 25 February 2021].

*Employee Relations*, 2020. Why Are Employees The Most Valuable Intangible Assets?. Available at: <https://www.educba.com/employee-most-valuable-intangible-assets/> [Accessed 25 February 2021].