System Requirements Specification

Theater Ticket System

Version 1.0

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UAH / CS650 / Software Engineering Process

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Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Revision | Change Description | Name |
| 2014/10/08 | 1.0 | Initial document creation | A. Kesterson |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Part I**

# Introduction

## Purpose of This Document

The purpose of this document is to detail the requirement specifications for the Theater Ticket System (TTS). This document is intended to outline the requirements of the system as a whole and display the desired functionality. The document itself is composed of two parts which are further divided into specific areas. Part one will outline the system requirements and estimations. Part two will outline the planned process operations, collaboration, and quality assurance strategies.

## Glossary of Terminology

Table 1.2‑1 Glossary

|  |  |
| --- | --- |
| Term | Definition |
| Customer Service Agent (CSA) | A person who reserves a ticket for the patron and enters information in the machine. |
| Event | A thing that takes place or an action which happens. |
| Event Series | A sequence of actions taking place to perform a particular task. |
| Locked Seat | Seats in the process of being reserved for patrons. |
| Patron | A person who calls the CSA to book a ticket. |
| Payment Gateway | An e-commerce application service provider that authorizes credit card payments for e-businesses. |
| Reserved Seat | Seats preserved by a patron through the phone. |
| Theater Ticket Database | An application which stores information regarding ticket purchase and patron details. |

# Overall Description

## Scope

The TTS manages the different tasks involved with handling ticket sales for an event at a specified venue. A customer service agent (CSA) interacts with the TTS to handle the ticket sales, ticket reservation, or ticket exchanges for a patron either by telephone, in person prior to an event, or at the event’s venue. The TTS will also allow the CSA to sell a patron season tickets or to track patron information for customized ticket purchases. The TTS will also track ticket purchase information, reserved seating, custom patron data, and season ticket status in a remote database. The database should be available for access at both the CSA’s office site and any event venue ticket location.

## System Features

### Event Reporting

The TTS will support the capability for CSAs to run various types of reporting metrics about ticket sales. This will allow them to determine answers to questions such as "What percentage of seats were sold for Event X?”

### Captures All Patron Information

The TTS will store customer information. This will allow a CSA to more easily assist repeat patrons without requiring them to provide all required information every time they wish to purchase tickets.

### Multiple Venue Support

The TTS will support multiple types of venues where events will take place. Different venues have different physical locations and seating capabilities. The system will use this information to properly allow seat reservation by the CSA for the patron.

### Multiple Event Support

The TTS will support multiple events. Each event occurs at a particular venue, date, and time. The system will support querying for events so the CSA can easily place reservations for the patrons.

### Event Season Support

The TTS will support multiple related events in what is called an event season. Grouping a series of events into seasons allows the CSA to more easily reserve tickets on behalf of a patron for all related events.

## System Assumptions

Several assumptions about the system were identified:

1. The system is up and running.
2. Tickets are available for the desired event.
3. There is a working telephone line at the organization’s office.
4. There is proper connectivity to all third party systems.
5. There are CSAs available to work telephone lines and any event ticket booth.
6. The patron can provide a valid form of payment.
7. There is a third party payment system available to handle non cash payments.
8. Operating system versions are compatible.
9. A third party database system will be utilized to handle persistent data for the TTS.
10. A ticket booth at an event will have a data connection to the database.

## System Constraints

1. The TTS software must operate on a typical Windows machine that can be used at both the organization’s office and at any ticket booth of an event.
2. An external system will handle the management of events in the database. Items such as creating an event, cancelling an event, setting the maximum event tickets, etc. would all be handled by this external system.

# Requirements

## CSA Requirements

The importance of defining CSA requirements is to identify the minimum functionality to be provided by the system for the benefit of the CSA.

Table 3.1‑1 CSA Requirements

|  |  |
| --- | --- |
| CSA  Requirement  Number | Requirements Description |
|  | The CSA shall have the capability to enter customer data. |
|  | The CSA shall have access to theater venues. |
|  | The CSA shall have access to theater events. |
|  | The CSA shall have access to seat availability. |
|  | The CSA shall be able to book reserved seating. |
|  | The CSA shall be able to book general admission seating. |
|  | The CSA shall be able to accept patron payments. |
|  | The CSA shall be able to exchange tickets. |
|  | The CSA shall be able to refund tickets. |
|  | The CSA shall be able to book season tickets. |
|  | The CSA shall be able to book VIP seating. |
|  | The CSA shall be able to book special accommodation seating. |

## TTS Requirements

The TTS requirements refinement process examines each CSA requirement to see if it meets the characteristics of a good requirement. Each CSA requirement will be decomposed into a refined set of requirements. Newly derived requirements are created from this process, which continues until all requirements are defined, analyzed, and the final project architecture is defined.

Table 3.2‑1 TTS Requirements

|  |  |
| --- | --- |
| TTS  Requirement  Number | Requirements Description |
| REQ100 | TBD |

# Models and Diagrams

## Use Case Diagram – TTS Level 0

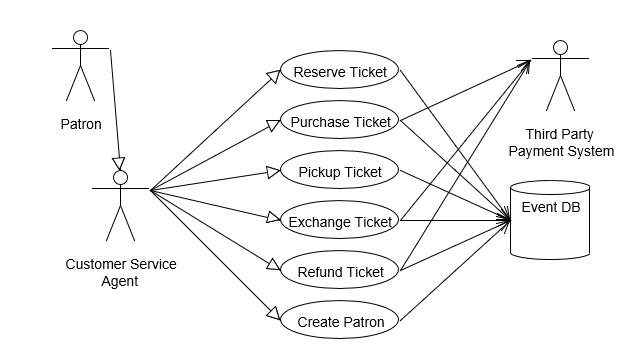


Figure 4.1‑1 TTS Level 0 Use Case

### Reserve Ticket Use Case

#### Use Case Description

Table 4.1‑1 Reserve Ticket Use Case

|  |  |  |
| --- | --- | --- |
| UC Name | Reserve Ticket | |
| Description | The Reserve Ticket Use Case describes the process which will allow a CSA to reserve a ticket for a patron. | |
| Actors | Customer Service Agent (CSA) | |
| Pre-Conditions | A CSA is available.  The TTS is operational.  The CSA is logged in to TTS. | |
| Post-Conditions | A ticket is reserved for a patron.  The selected tickets are no longer available for other patrons. | |
| Triggers | A patron wishes to reserve a ticket. | |
| Flow | | |
|  | Actor | System |
|  | Query seats for a specific event |  |
|  |  | Search for a specific Event. |
|  |  | Return results available seats. |
|  | Select a seat |  |
|  |  | Verify seat is available, and lock selected seat. |
|  | Query for the patron’s information. |  |
|  |  | Search for the patron. |
|  |  | Return results for the searched patron. |
|  | Select the correct patron. |  |
|  |  | Verify selected patron. |
|  |  | Associate locked seat with selected patron. |
|  | | |
| Exceptions | | |
| E1 | **The event does not exist, or cannot be found** | |
| Flow | | |
|  | Actor | System |
|  |  | The system informs the CSA that the event cannot be found. |
|  | The CSA exits the use case. |  |
|  | | |
| E2 | **Tickets for the event are sold out** | |
| Flow | | |
|  | Actor | System |
|  |  | Return result no available seats. |
|  | Exit Use Case |  |
|  | | |
| E3 | **The selected seat is unavailable** | |
| Flow | | |
|  | Actor | System |
|  |  | Return that seat is not available, and return updated list of available seats. |
|  | Exit Use Case |  |
|  | | |
| E4 | **Patron does not exist – Do not create new Patron** | |
| Flow | | |
|  | Actor | System |
|  |  | Return results that patron does not exist. |
|  | Exit Use Case |  |
|  |  | Release lock for selected seat. |
|  | | |
| E5 | **The patron cannot be verified** | |
| Flow | | |
|  | Actor | System |
|  |  | Return that the patron is not valid. |
|  | Exit Use Case. |  |
|  |  | Remove lock for selected seat. |
|  | | |
| Alternate Flow | | |
| A1 | **The event does not exist, or cannot be found** | |
| Flow | | |
|  | Actor | System |
|  |  | The system informs the CSA that the event cannot be found. |
|  | The CSA searches for a different event. (Return to step 2). |  |
|  | | |
| A2 | **Tickets for the event are sold out** | |
| Flow | | |
|  | Actor | System |
|  |  | The system informs the CSA that no seats can be found for the event. |
|  | The CSA searches for a different event (Return to step 2). |  |
|  | | |
| A3 | **The selected seat is unavailable** | |
| Flow | | |
|  | Actor | System |
|  |  | Return that seat is not available, and return updated list of available seats. |
|  | Query again for a different seat (Return to step 4). |  |
|  | | |
| A4 | **Patron does not exist – Create Patron** | |
| Flow | | |
|  | Actor | System |
|  |  | Return results that patron does not exist. |
|  | The CSA enters the use case for Create Patron. |  |
|  | The CSA agent selects the Patron. |  |
|  | | |
| A5 | **The patron cannot be verified** | |
| Flow | | |
|  | Actor | System |
|  |  | Return that the patron is not valid. |
|  | The CSA searches for a different patron (Return to step 6). |  |
|  | | |
| Extension Points | Create Patron | |

#### Activity Diagram

TBD

#### Function Point Estimate

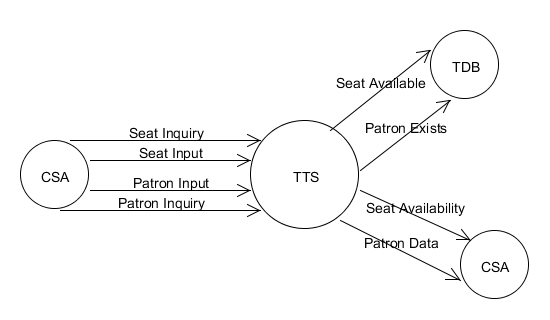


Figure 4.1‑2 Reserve Ticket Function Point Diagram

Table 4.1‑2 Reserve Ticket Function Point Estimation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Simple | Average | Complex | Count |
| External Inputs | 2 | 3 | 4 | 6 | 8 |
| External Outputs | 2 | 4 | 5 | 7 | 10 |
| External Inquiry | 2 | 3 | 4 | 6 | 8 |
| Internal Logic Files | 0 | 7 | 10 | 15 | 0 |
| External Interface Files | 2 | 5 | 7 | 10 | 14 |
|  | | | **Count Sub Total** | | 40 |
| **∑F** | | 38 |
| **FP Total** | | 42 |

## Purchase Ticket Use Case

#### Use Case Description

|  |  |  |
| --- | --- | --- |
| UC Name | Purchase Ticket By Cash | |
| Description |  | |
| Actors | CSA | |
| Pre-Conditions | Patron is ready to pay for a reservation  A reservation is selected.  The TTS is working. | |
| Post-Conditions | Success: The reservation is paid in full.  Failure: The reservation is still active, but not paid in full. | |
| Triggers | A patron wishes to reserve a ticket. | |
| Flow | | |
|  | Actor | System |
|  | Selects payment type of cash. |  |
|  | Enters the patron’s payment amount, and submits the payment. |  |
|  |  | Verifies that the payment amount matches the reservation amount. |
|  |  | The system indicates that the payment is accepted. |
|  | | |
| Exceptions | | |
|  | | |
| E1 | **Payment is not sufficient.** | |
|  | Actor | System |
|  |  | Payment amount is less than the reservation amount. |
|  |  | Return payment not accepted. |
|  | Exit the use case. |  |
|  | | |
| Alternate Flow | | |
| A1 |  | |
| Flow | | |
|  | Actor | System |
|  |  | Payment amount is less than the reservation amount. |
|  |  | Return payment not accepted. |
|  | Return to step 2. |  |
|  | | |
| Extension Points |  | |

|  |  |  |
| --- | --- | --- |
| UC Name | Purchase Ticket By Electronic | |
| Description |  | |
| Actors | CSA | |
| Pre-Conditions | Patron is ready to pay for a reservation  A reservation is selected.  The TTS is working. | |
| Post-Conditions | Success: The reservation is paid in full.  Failure: The reservation is still active, but not paid in full. | |
| Triggers | A patron wishes to reserve a ticket. | |
| Flow | | |
|  | Actor | System |
|  | Selects payment type of credit. |  |
|  | Enters the patron’s payment amount, and submits the payment. |  |
|  |  | Verifies that the payment amount matches the reservation amount. |
|  |  | Process the payment utilizing the Validate Patron Payment use case. |
|  |  | The system indicates that the payment is accepted. |
|  | | |
| Exceptions | | |
|  | | |
| E1 | **Payment is not sufficient.** | |
|  | Actor | System |
|  |  | Payment amount is less than the reservation amount. |
|  |  | Return payment not accepted. |
|  | Exit the use case. |  |
|  | | |
| Alternate Flow | | |
| A1 | **Payment is not sufficient.** | |
| Flow | | |
|  | Actor | System |
|  |  | Payment amount is less than the reservation amount. |
|  |  | Return payment not accepted. |
|  | Return to step 2. |  |
|  | | |
| Extension Points | Validate Patron Payment | |

|  |  |  |
| --- | --- | --- |
| UC Name | Verify Patron Payment | |
| Description | The Verify Patron Payment (VPP) describes how the system needs to interact with an external payment system automate the process of validating an electronic payment. Since this is an internal use case the TSS acts as the actor to the external payment system. | |
| Actors | TTS | |
| Pre-Conditions | Purchase Ticket Payment is not cash  Patron has submitted payment information.  The external payment system is available. | |
| Post-Conditions | Success: The payment is validated.  Failure: The payment is not successful. | |
| Triggers | The system needs to approve an electronic transfer of funds. | |
| Flow | | |
|  | Actor | System |
|  | Submits the patron’s payment information utilizing the external payment system’s API. |  |
|  |  | Indicates that the payment information is valid. |
|  | Submits the amount to be charged utilizing the external payment system’s API. |  |
|  |  | Indicates that the charge amount is not accepted. |
|  | | |
| Exceptions | | |
|  | | |
| E1 | **Payment information is incorrect.** | |
|  | Actor | System |
|  |  | Indicates that the payment information is not valid. |
|  | Exit the use case. |  |
|  | | |
| E1 | **Charge amount cannot be verified.** | |
|  | Actor | System |
|  |  | Indicates that the charge amount is not verified. |
|  | Exit the use case. |  |
|  | | |
| Extension Points | Validate Patron Payment | |

#### Sequence Diagram

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**Part II**

# How We Operate

## Roles

Table 1.1‑1 Team Member Roles

|  |  |
| --- | --- |
| Role | Team Member |
| Scribe | Samantha, Anthony (alt) |
| Submitter | Samantha |
| Meeting Scheduler | Angela |
| UML Modeler | Andy, Sumeet |
| Task Coordinator | Angela |
| Configuration Manager | Andy |
| Quality Assurance Manager | Rashad |
| Reviewer | All |
| Tester | All |
| Use Case Development | All |

## Tools Used

The team will utilize git for documentation version control, and UMLet to develop UML diagrams.

The team plans to utilize the services of GitHub for hosting the change tracking and version control repository.

## Team Communication Strategy

The team has decided to meet weekly on Tuesdays and Wednesdays at 7:00 pm at the university. Telephone conferences may be scheduled as necessary. The team will also use Angel and UAH email for general communication during the semester.

## Team Quality Assurance Strategy

The Quality Assurance plan describes how the team will implement a procedure to ensure that all products are delivered with the highest quality possible. Each team member will review all work products before delivery to the customer. Informal peer reviews of all work products will be conducted multiple times a week. The review type will be round robin with comments and suggestions from each team member provided. During the review, several types of work products will be reviewed for overall quality and correctness. These include use cases, activity diagrams, sequence diagrams, and any written documentation that is created. After the review is performed, the Quality Assurance lead is responsible for verifying that all of the accepted comments and input from each team member has been addressed, and that the overall product has all of the required components. After the Quality Assurance manager verifies that all of the comments from the review have been addressed, each team member will perform a final check of the product and report to the Quality Assurance manager that they accept it before the product is delivered.

## Project Schedule

For our team project, a centralized team structure will be used. All team members will work together on each part of the project with specific tasks for each phase of the project. Assignment of tasking will be based on each team member’s roles based on varied skills and talents. For each deliverable, there will be a specific set of tasks that will be added to the schedule with resources allocated as appropriate for the tasks.

Table 1.5‑1 Theater Ticket System Project Schedule

| Delivery | Task | Person Responsible | Due Date |
| --- | --- | --- | --- |
| Delivery 1 Part 1 | Create document cover page, revision history page, table of contents, table of figures and table of tables | Samantha | Oct 7 |
|  | Revise Scope and project description | Andy | Oct 7 |
|  | Create Glossary | Sumeet | Oct 7 |
|  | Describe features of the system | Anthony | Oct 7 |
|  | Create CSA requirements table | Angela | Oct 7 |
|  | Create future software requirements table | Angela | Oct 7 |
|  | Identify software requirements | TBD | TBD |
|  | Create top level use case diagram | Andy | Oct 7 |
|  | Create Reserve Ticket Use Case description | Andy | Oct 7 |
|  | Create Reserve Ticket Activity Diagram | TBD |  |
|  | Create Reserve Ticket Function Point estimate artifacts | Andy | Oct 7 |
| Delivery 1 Part 2 | Describe how we will operate, roles, tools to be used, common strategy | Samantha | Oct 7 |
|  | Describe QA strategy | Rashad | Oct 7 |
|  | Create Project Schedule | Angela | Oct 7 |
|  | Write up meeting minutes | Samantha | Oct 7 |
|  | Integrate tasks for Delivery 1 | All contribute with one person creating the master | Oct 7 |
|  | Peer review Delivery 1 | All | Oct 8 |
|  | Submit Delivery 1 | Samantha | Oct 8 |
| Delivery 2 | TBD | TBD | Oct 29 |
| Delivery 3 | TBD | TBD | Nov 17 |
| Final Delivery | TBD | TBD | Dec 1 |
| Presentation | TBD | TBD | Nov 24, Dec 01 |

## Meeting Minutes

Table 1.6‑1 Team Meeting Minutes

| Date | Description | Attendees |
| --- | --- | --- |
| 9/20/14  2pm | Team meeting dates fixed. Project topic was chosen. | Andy, Samantha, Sumeet, Rashad (via phone), Angela, Anthony |
| 9/23/14  7pm | Team members reviewed the proposal and signed off. | Andy, Samantha, Sumeet, Rashad, Angela, Anthony |
| 10/4/14  10am | Completed a white board discussion of Delivery 1 Part 1 and most of Part 2. | Andy, Samantha, Sumeet, Rashad, Angela, Anthony |
| 10/5/14  2pm | Completed a white board discussion of Delivery 1 Part 2. Assigned tasks to team members and laid out the document template and project schedule. Computed function points. | Andy, Samantha, Sumeet, Rashad, Angela, Anthony |
| 10/7/14  7pm | Checked progress on assigned tasks. | Andy, Samantha, Sumeet, Rashad, Angela, Anthony |
| 10/8/14  7pm | Completed an informal peer review for Delivery 1. Submitted Delivery 1. | Andy, Samantha, Sumeet, Rashad, Angela, Anthony |

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**Appendix A**

**Requirements Traceability Matrices**

CSA to TTS Requirements Traceability Matrix

|  |  |  |  |
| --- | --- | --- | --- |
| CSA  Requirement  Number | Requirement Description | TTS  Requirement  Number | Use Case |
|  | The CSA shall have the capability to enter customer data. | TBD |  |
|  | The CSA shall have access to theater venues. | TBD |  |
|  | The CSA shall have access to theater events. | TBD |  |
|  | The CSA shall have access to seat availability. | TBD |  |
|  | The CSA shall be able to book reserved seating. | TBD |  |
|  | The CSA shall be able to book general admission seating. | TBD |  |
|  | The CSA shall be able to accept patron payments. | TBD |  |
|  | The CSA shall be able to exchange tickets. | TBD |  |
|  | The CSA shall be able to refund tickets. | TBD |  |
|  | The CSA shall be able to book season tickets. | TBD |  |
|  | The CSA shall be able to book VIP seating. | TBD |  |
|  | The CSA shall be able to book special accommodation seating. | TBD |  |

TTS to CSA Requirements Traceability Matrix

|  |  |  |  |
| --- | --- | --- | --- |
| TTS  Requirement  Number | Requirement Description | CSA  Requirement  Number | Use Case |
| REQ100 | TBD | TBD |  |