



Revision for midterm and exam structure

SWE 312 – Designing the User-Interface

Course Objectives

The course objectives are to:

- Introduce fundamental concepts of design, implementation, and evaluation of user interface.
- Expose students to novel interfaces that go far beyond today's standard graphical user interfaces.

Relationship of Course Learning Outcomes

Upon completion of this course, students will have the ability to:

- Create user interface designs using the components of different interaction styles.
- Evaluate user interfaces for usability.
- Follow usability engineering principles while designing user interfaces.
- Use different software tools for visual prototyping
- Demonstrate a prototype of a project.
- Create different types of manuals such as: user Manuals, Online Help and Tutorials
- Work as a team leader and a member of a team.



Chapter 1

Usability of Interactive Systems

Dr Mahmood Niazi

Objectives

- Introduction to Usability
- Usability Requirements
- Usability Factors
- Usability Goals and Measures
- Usability Motivations
- Universal usability

What is Usability?

- **Usability** is the ease of use and learnability of a human-made object such as software application, website, book, tool, process, or anything a human interacts with.
- Allowing intended users to accomplish their tasks in the best way possible.
- How well users can use the system's functionality?

Why is usability important?

- From the user's perspective
 - Usability can make the difference between performing a task accurately and completely or not, and enjoying the process or being frustrated.
- From the developer's perspective
 - Usability is important because it can mean the difference between the success or failure of a system.
- From a management point of view
 - Software with poor usability can reduce the productivity of the workforce to a level of performance worse than without the system.
- In all cases, lack of usability can cost time and effort, and can greatly determine the success or failure of a system.
- Given a choice, people will tend to buy systems that are more user-friendly.

► Usability Factors

■ There are six factors

1. **Fit for Use** (support tasks what user wants)
2. **Ease of learning** (learn for various groups of users)
3. **Task Efficiency** (Quick tasks for frequent users)
4. **Ease of Remembering** (remember tasks for occasional users)
5. **Subjective Satisfaction** (how user will satisfy overall?)
6. **Understandability** (understand what system or each individual module does?)

► Usability Measures

- The following usability measures lead more directly to practical evaluation:
 1. *Time to learn*
How long does it take for typical members of the community to learn actions relevant to a set of tasks?
 2. *Speed of performance*
How long does it take to carry out the benchmark tasks?
 3. *Rate of errors by users*
How many and what kinds of errors are made during benchmark tasks?
 4. *Retention over time*
How well do users maintain their knowledge after an hour, a day, or a week? Frequency of use and ease of learning help make for better user retention
 5. *Subjective satisfaction*
How much did users like using various aspects of the interface?
The answer can be ascertained by interviews, free-form comments and satisfaction scales

Universal Usability

- The diversity of human abilities, background, motivations, personalities, cultures, and work styles challenges interface designers.
- Understanding the physical, intellectual and personality differences between users is vital for getting participation by broadest set of users
- Sometimes accommodating the needs of one group benefits other groups as well.



Chapter 2

Guidelines, Principles, and Theories

Guidelines

- Guidelines are based on experience
 - Record best practices derived from practical experience or empirical studies with appropriate examples and counterexamples (an example or fact that is inconsistent with a hypothesis), work of graphics designers
- Promote consistency among multiple designers in terminology, appearance, and action sequences
 - Apple and Microsoft guidelines for desktop applications
 - Guidelines for the web and mobile devices

Some UI design guidelines

- Navigating the interface
- Organizing the display
- Getting the user's attention
- Facilitating data entry

Principles

- While guidelines are narrowly focused, principles tend to be more fundamental, widely applicable, and enduring than guidelines
- Fundamental principles
 - Determine user's skill levels
 - Identify the tasks
 - Five primary interaction styles
 - Eight golden rules of interface design
 - Prevent errors
 - Simplicity
 - Structure
 - Consistency
 - Tolerance



Chapter 3

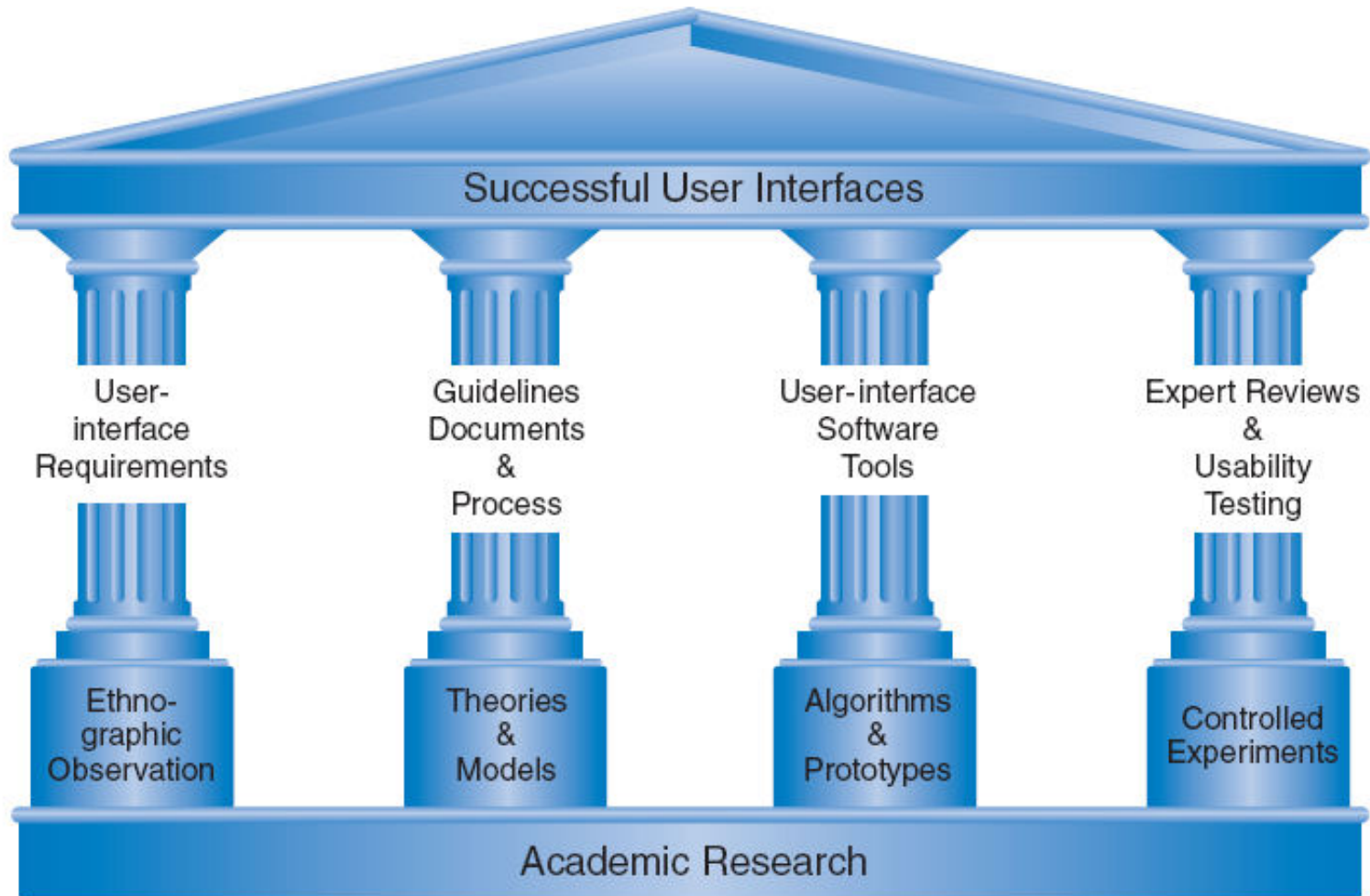
Managing Design Processes



Outline

- Introduction (usability engineering)
- Four pillars of design
- Development methodologies
- Ethnographic observation
- Participatory design
- Scenario development

The Four Pillars of Design





Chapter 4

Evaluating Interface Designs

Agenda

- To understand the usability evaluation process.
- To understand how to create an evaluation strategy.
- To understand how to create an evaluation plan.
- Experts reviews
- Usability Testing Laboratories
- Survey Instruments
- Acceptance test
- Evaluation During Active Use



Evaluation strategy

- **What** is the purpose of the evaluation? Are there any specific concerns or questions that you want to ask the participant about? Are there any usability requirements to explore?
- **What** data do you need to collect?
- **What** product, system, or prototype are you testing?
- **What** constraints do you have?

Evaluation plan

- Choosing your users (Who?)
- Creating a timetable (When?)
- Preparing task descriptions (What?)
- Deciding where to do the evaluation (Where?)

► Expert Reviews

- There are a variety of expert review methods to chose from:
 - ☐ Heuristic evaluation
 - ☐ Guidelines review
 - ☐ Consistency inspection
 - ☐ Cognitive walkthrough
 - ☐ Formal usability inspection



Survey Instruments

- Written user surveys are a familiar, inexpensive and generally acceptable companion for usability tests and expert reviews.
- Large number of respondents offer a sense of authority compare to the potentially biased and variable results from small numbers of usability participants or expert reviewers
- Keys to successful surveys
 - Clear goals in advance
 - Development of focused items that help attain the goals.



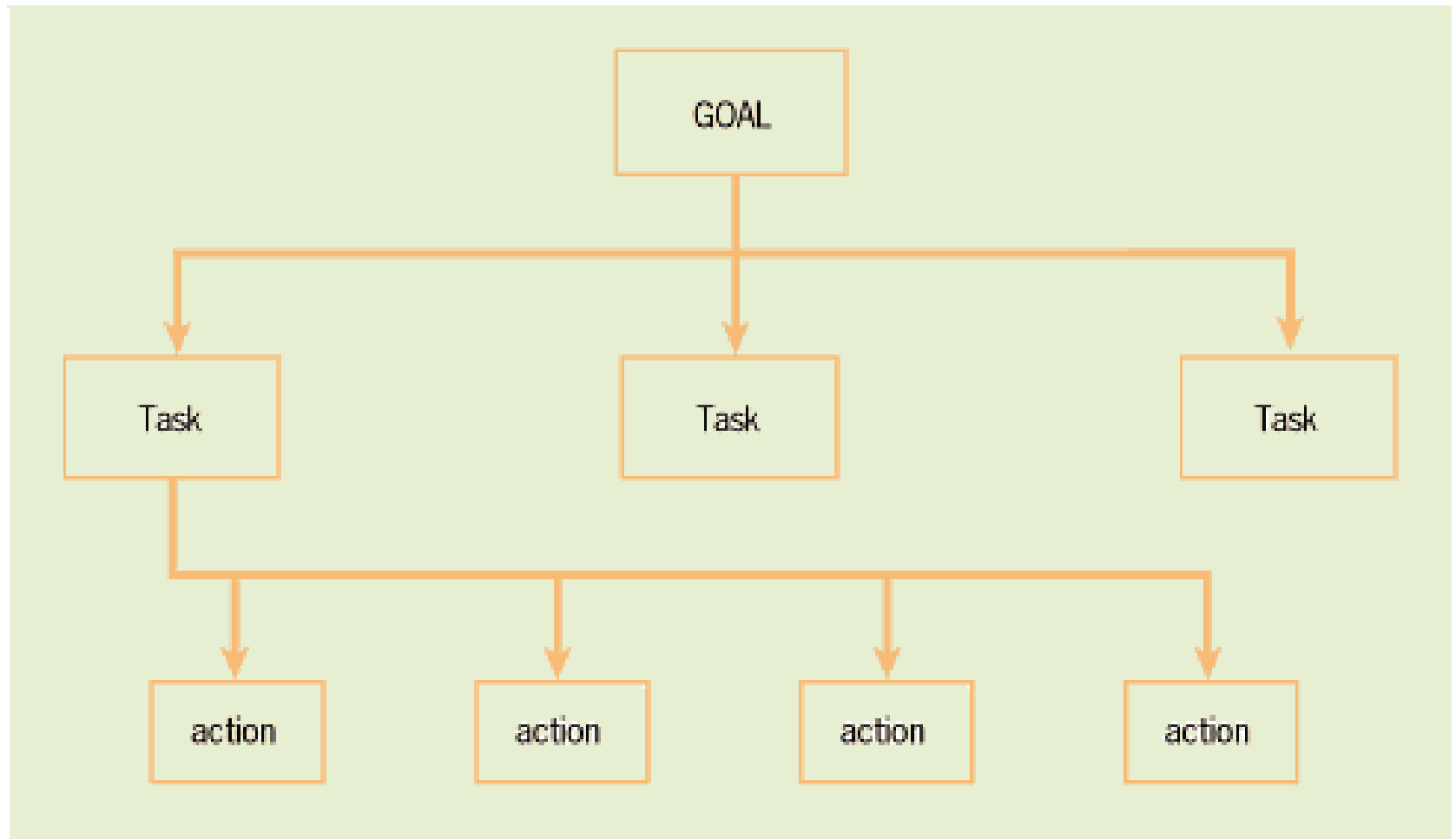
Task and User Analysis

Dr Mahmood Niazi

Objectives

- To understand the relationship between goals, tasks and actions.
- To understand different techniques for task analysis.
- To understand the needs of users of different experience levels
 - beginners, intermediates, and expert.

Relationship between goals, tasks, and actions

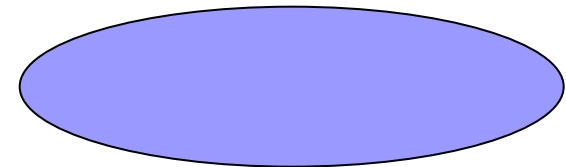


Some task are decomposable into subtasks before the action level is reached.

Use Case modeling and documenting

A **use case** is a behaviorally related sequence of steps (a scenario), both automated and manual for the purpose of completing a single business task. A use case represents steps in a specific business process

- Submit change of address
- Maintain member order
- Make purchase inquiry



Make appointment

Use Case modeling and documenting

An **actor** represents anything that needs to interact with the system to exchange information. An actor is a user, a role, which could be an external system as well as a person.

- Club member
- Doctor
- Patient



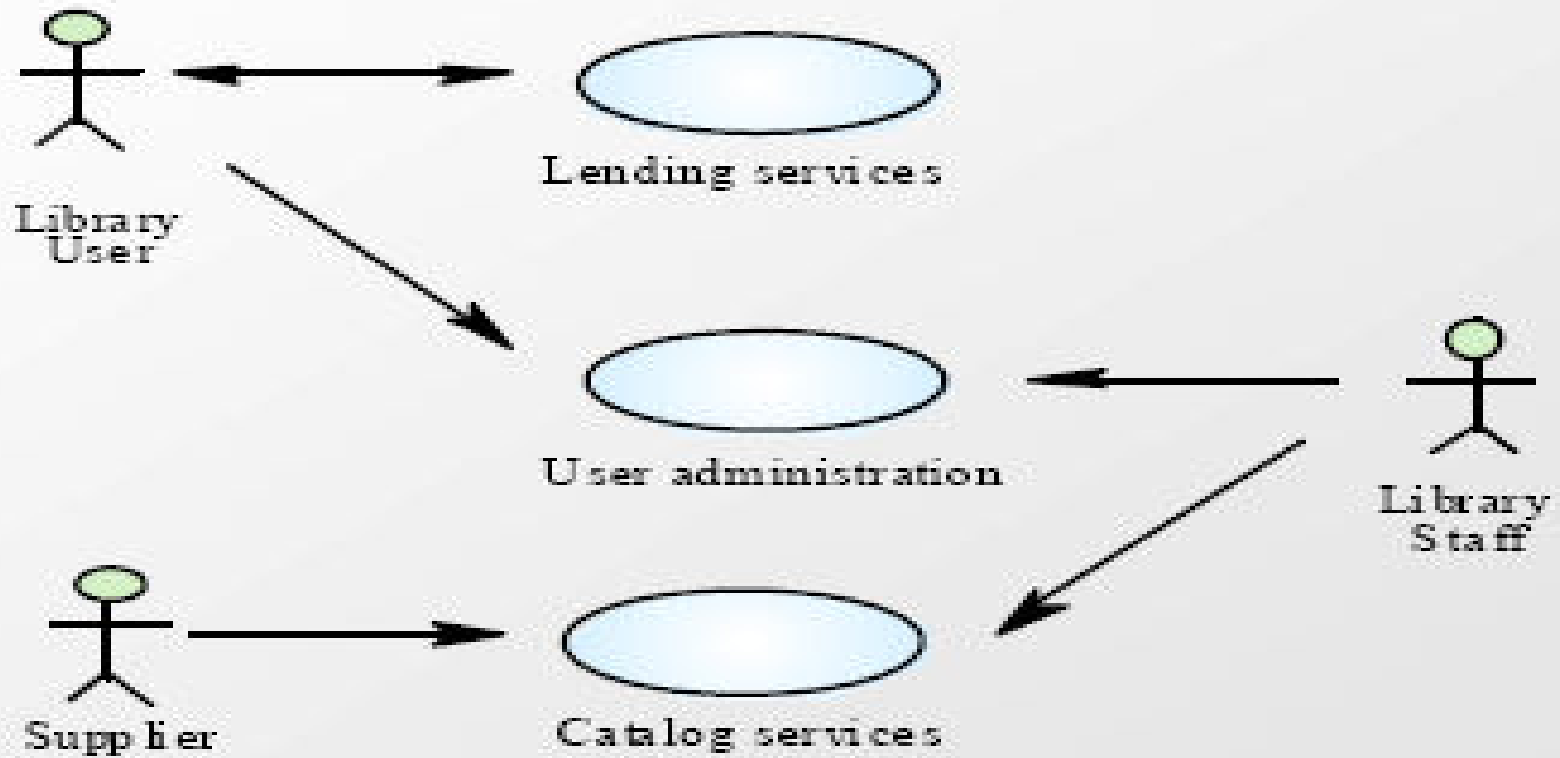
An actor

□ Communication



Use Case modeling and documenting

Library use-cases





Use Case modeling and documenting



Step 1: Identifying Actors and Use Cases

Step 2: Constructing a Use Case Model Diagram

Step 3: Document the Use Case Course of Events

Example Use Cases: Class activity

Consider typical post office and the processes involved in selling stamps, renting post office boxes and delivering mail to postal customers.

Identify possible actors and use cases involved in post office functions

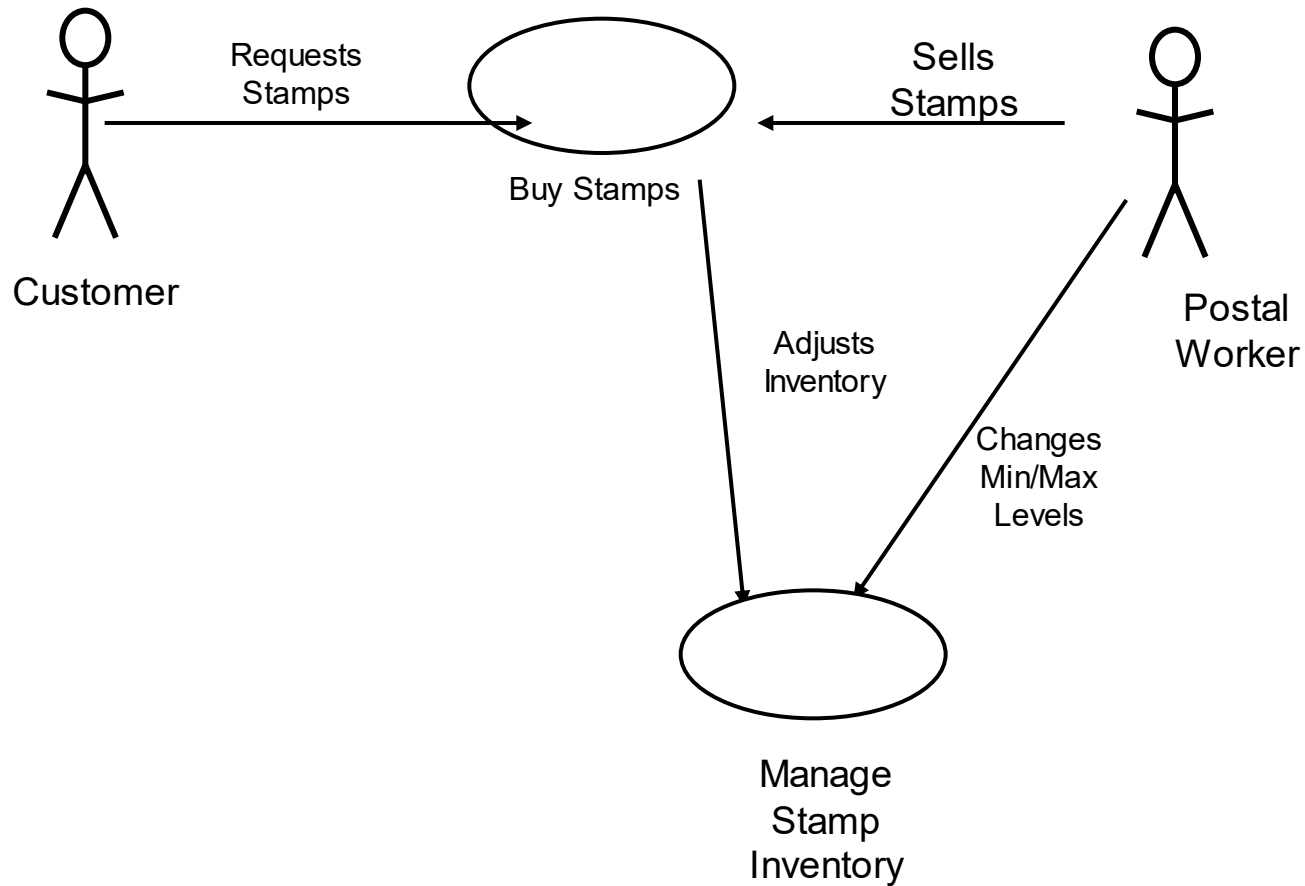
Create a use case diagram for any two use cases of the post office system

Complete a use case description document for any one use case

Actors might include Customer, Postal Worker, and Route Carrier.

Use cases might include Buy Stamps, Manage Stamp Inventory, Rent P.O. Box, Certify Mail, Deliver Mail, Sort Incoming Mail.

Example Use Cases diagram



Example Use Case description document

<i>Name:</i>	<i>Buy Stamps</i>
<i>Actor:</i>	<i>Customer/Postal Worker</i>
<i>Description:</i>	<i>This use case describes the process used to buy stamps at the post office</i>
<i>Successful Completion</i>	<ol style="list-style-type: none"><i>1. Customer requests stamps</i><i>2. Postal Worker checks on availability of stamps</i><i>3. Stamps are available and customer pays fee</i><i>4. Customer receives stamps and stock is adjusted</i>
<i>Alternative:</i>	<ol style="list-style-type: none"><i>1. Customer requests stamps</i><i>2. Postal Worker checks on availability of stamps</i><i>3. Stamps are not available and customer selects alternate stamps or no stamps</i><i>4. Customer receives stamps and stock is adjusted (if alternate stamps selected) or customer leaves with no stamps</i>
<i>Pre-condition:</i>	<i>Customer wants to purchase stamps</i>
<i>Post-Condition:</i>	<i>None</i>
<i>Assumptions:</i>	<i>Customer has enough money</i>

Example Use Case description document

Use Case Number			
Use Case Name			
Author/Source			
Date of Creation			
Precondition(s)			
Successful Post Condition			
Actors			
Priority			
Related Use Cases			
Flow of Events			
Main Flow			
User Action		System Response	
UA1		SR1	
UA2		SR2	
Alternative 1: Title			
User Action		System Response	
A1.UA1		A1.SR1	
A1.UA2		A1.SR2	
Alternative 2: Title			
User Action		System Response	
A2.UA1		A2.SR1	
A2.UA2		A2.SR2	