بسم الله الرحمن الرحيم

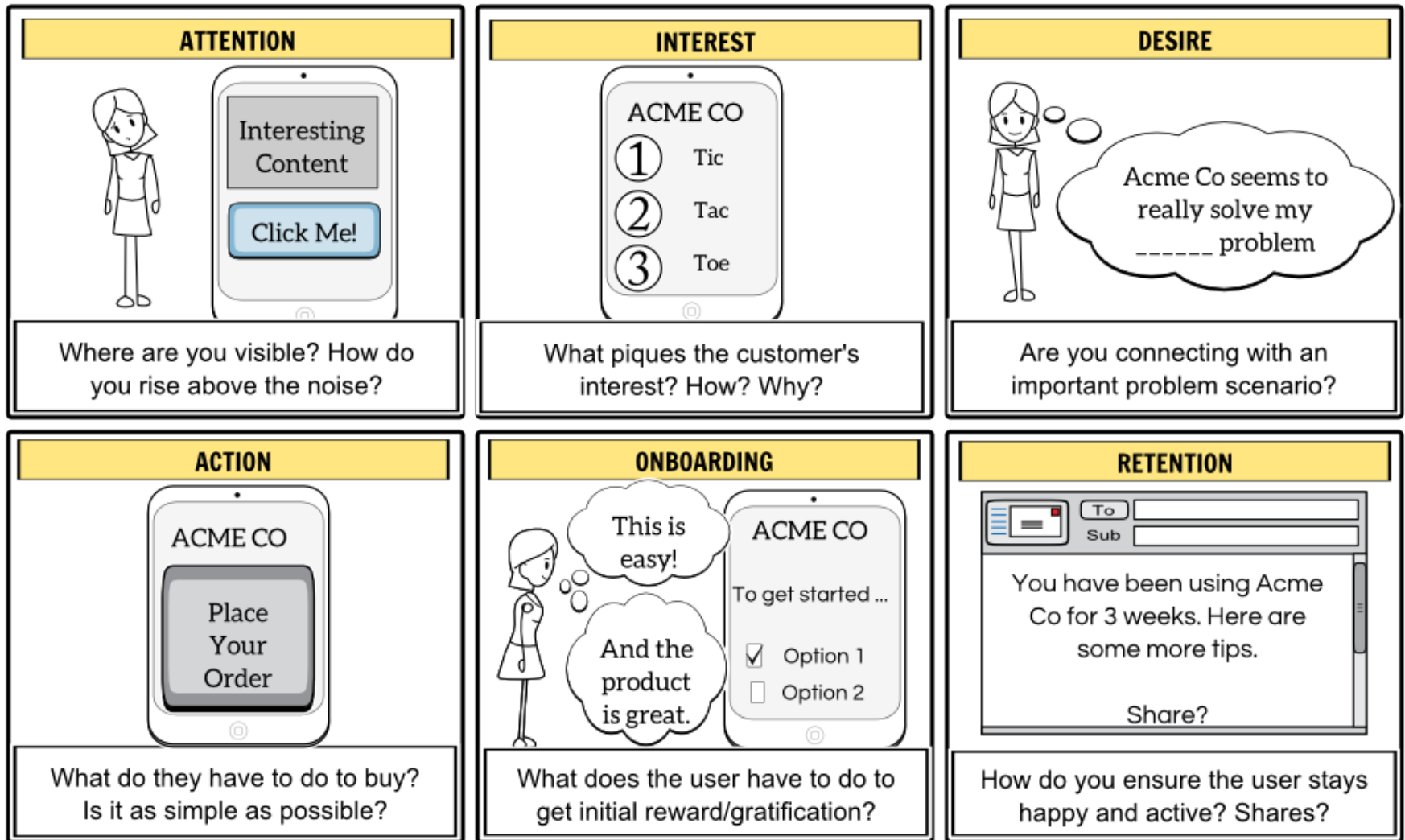# Software Requirement Engineering

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Storyboard

❑Storyboards, as used in the film industry, are a portfolio of sketches which briefly tell a story to a production team.

❑A Storyboard "tells a specific story".

❑A Storyboard is a logical and conceptual description of system functionality for a specific scenario, including the interaction required between the system users and the system.

❑Storyboard early and often on every project with new or innovative content.

Storyboard

❑A typical storyboard will contain a number of images depicting features such as menus, dialogue boxes and windows.

❑The formation of these screen representations into a sequence conveys further information regarding the structure, functionality and navigation options available within an intended system.

❑The storyboard can be shown to colleagues in a design team as well as potential users, which allows others to visualize the composition and scope of an intended interface and offer critical feedback.

❑This method can be used early in the design cycle where the use of storyboards supports the exploration of design possibilities and the early verification of user requirements.

Example: SB for Ship Emergency Management System

ATTENTION

Interesting Content

Click Me!

Where are you visible? How do you rise above the noise?

INTEREST

ACME CO
1. Tic
2. Tac
3. Toe

What piques the customer's interest? How? Why?

DESIRE

Acme Co seems to really solve my _____ problem

Are you connecting with an important problem scenario?

ACTION

ACME CO

Place Your Order

What do they have to do to buy? Is it as simple as possible?

ONBOARDING

This is easy!

And the product is great.

ACME CO

To get started ...

☑ Option 1
☐ Option 2

What does the user have to do to get initial reward/gratification?

RETENTION

To
Sub

You have been using Acme Co for 3 weeks. Here are some more tips.

Share?

How do you ensure the user stays happy and active? Shares?

Types of Storyboards

- **Passive storyboards**
  - Tell a story to the user.
  - Consist of sketches, pictures, screen shots, PowerPoint presentations, or sample application outputs.
  - Walks the user through the storyboard, with a "When you do this, this happens" explanation.
  - Example: Screen shots, Business rules, Output reports

- **Active storyboards**
  - Try to make the user see "a movie that hasn't actually been produced yet."
  - Provide an automated description of the way the system behaves in a typical usage or operational scenario.
  - Examples: Slideshow, Animation, Simulation

- **Interactive storyboards**
  - Let the user experience the system in as realistic a manner as practical.
  - Require participation by the user.
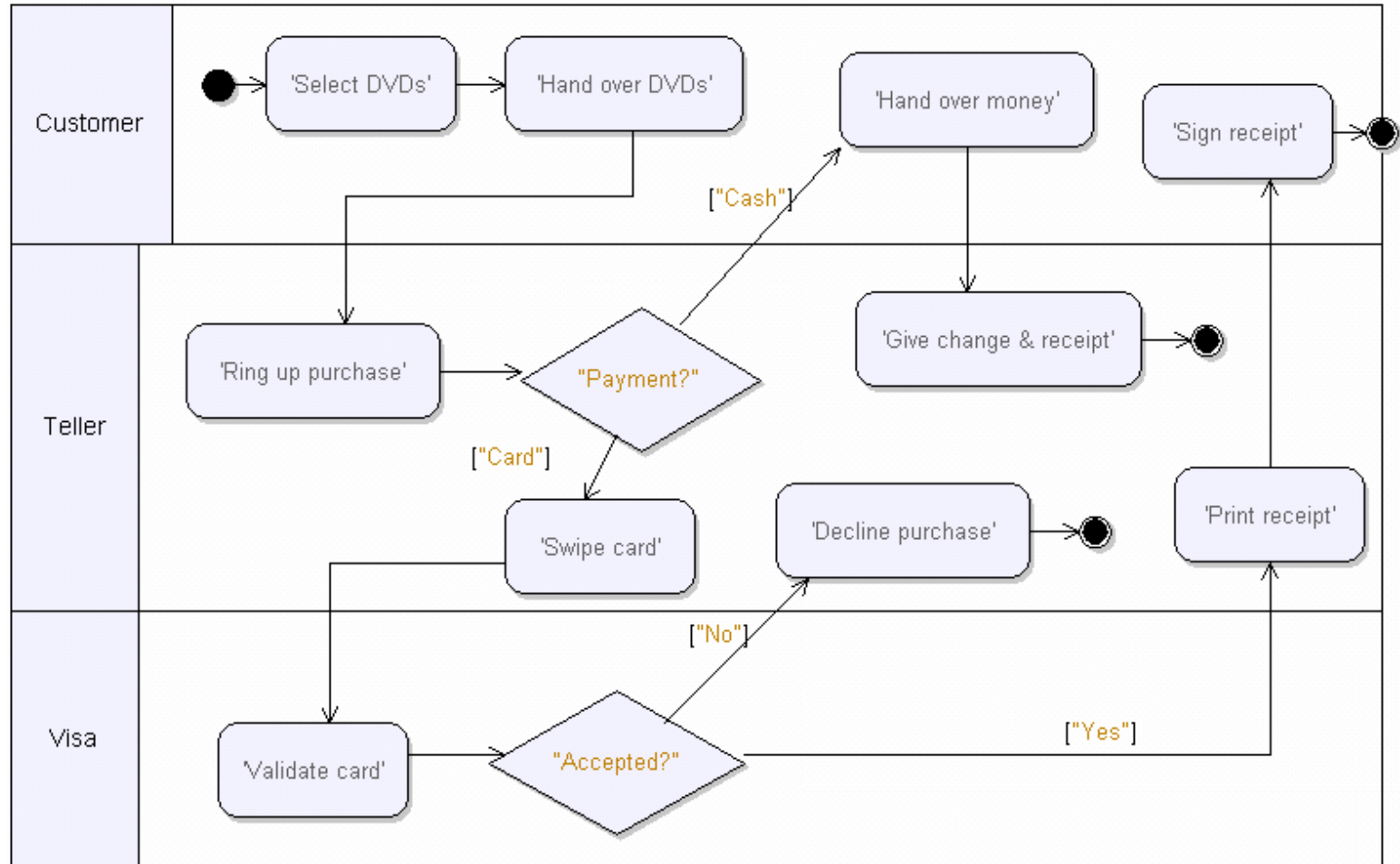 - Examples: Live Demos, Interactive presentations

Storyboarding

❑**Storyboards tell**

  ❑Who the players (actors) are?
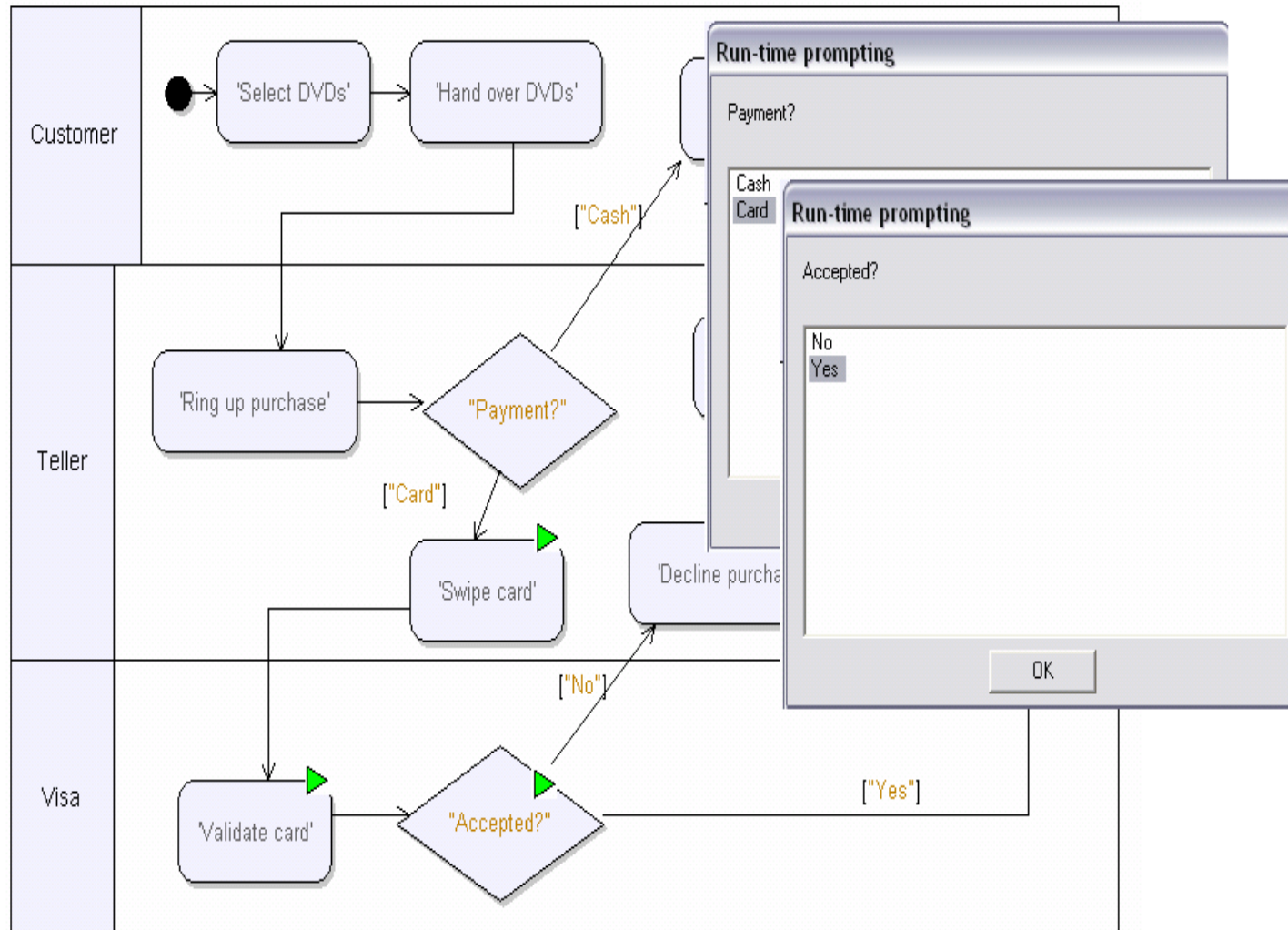
  ❑What happens to them?

  ❑How it happens?

❑**Typically expressed in the form of activity diagrams**

  ❑To show workflow or performed actions

  ❑May be partitioned to show control flow between

    different classes

A Sample Storyboard

Animating a Storyboard

Advantages

❑ Help gather and refine customer requirements in a user friendly way (promotes communication)

❑ Encourage creative and innovative solutions

❑ Encourage team review

❑ Prevent features no one wants

❑ Ensure that features are implemented in an accessible and intuitive way

❑ Ease the interviewing process

❑ Avoid the blank-page syndrome

❑ Storyboards can be created quickly and easily.

Disadvantages

❑ Storyboards may lack the interactive quality of prototyping

methods.

❑ Because of their simplicity, storyboards do not support the

evaluation of fine design detail.

❑ Storyboards do not accurately convey system

responsiveness.

Prototyping

Prototyping

❑ **Prototyping is the rapid development of a system demonstrating a portion of the functionality of the new system**

❑ **A prototype is an initial version of a system used to demonstrate concepts, elicits requirements and try out design options.**

❑ **A prototype can be:**

❑ A storyboard, i.e. a cartoon-like series of scenes

❑ A video simulating the use of a system

❑ A piece of software with limited functionality

❑ Written in the target language or in another language

# Why Prototype In General

❑ **Evaluation and feedback process can be achieved successfully.**

❑ **Developers can test feasibility of ideas with team & users.**

❑ **Stakeholders can see and interact with a prototype more easily than a document.**

❑ **Team members and users can communicate effectively.**

❑ **To validate existing / other requirements.**

❑ **Prototypes answer questions, and support designers in choosing between alternatives.**

Uses of Prototyping

❑ **The principal use is to help customers and developers understand the requirements for the system**

❑ **Requirements elicitation. Users can experiment with a prototype to see how the system supports their work**

❑ **Requirements validation. The prototype can reveal errors and omissions in the requirements**

❑ **Prototyping can be used in situations where the users are unable to express their requirements**

❑ **The prototype may be used for user training before a final system is delivered.**

Prototyping Process
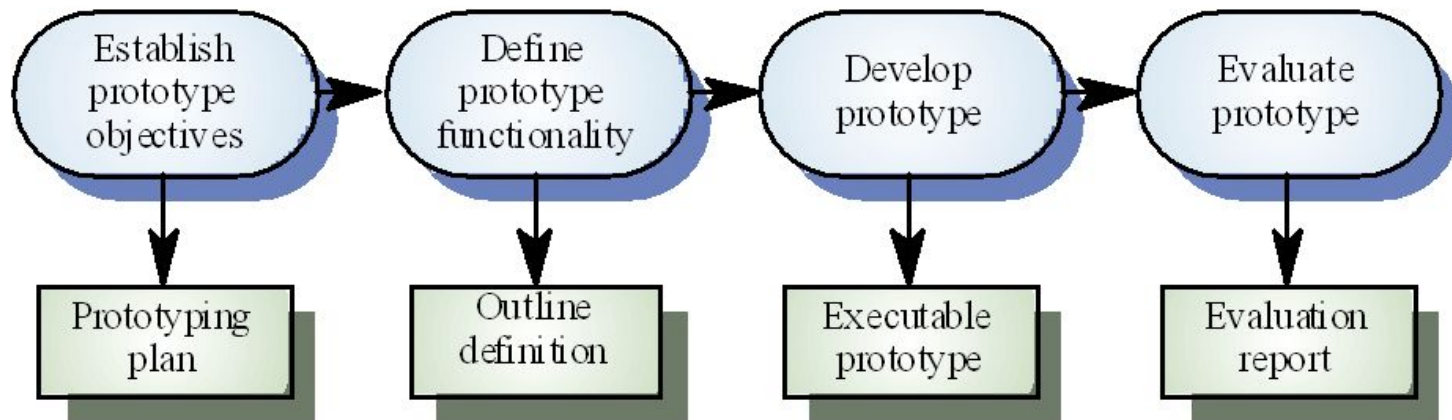
Wireframes & Mockups

Mockups, Wireframes & Prototypes

❑ **Mockup:**

 ❑ A model of a design or a device, used for teaching, demonstration, design evaluation, promotion, and other purposes.

❑ **Wireframe:**

 ❑ Also known as a page schematic, is a visual guide that represents the skelton framework of a website or an application.

 ❑ It focuses on "what a screen does, not what it looks like". The wireframe shows the page layout , including interface elements and navigational systems, and how they work together, main focus lies in functionality, behavior, and priority of content.

❑ **Prototype:**

 ❑ An early sample or model built to test a concept or process or to act as a thing to be replicated or learned from. A mockup is called a prototype if it provides at least part of the functionality of a system and enables testing of a design.
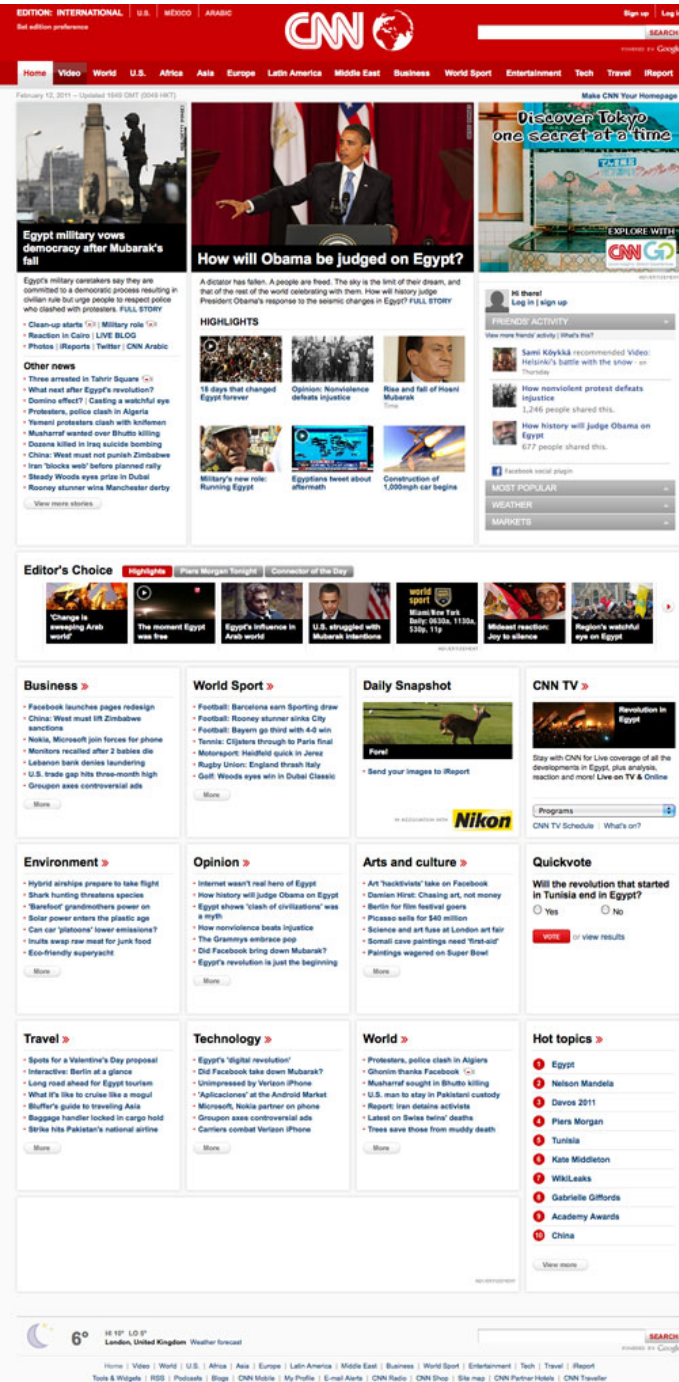
Wireframes & Mockups

❑**Some common Features**

❑Template specific for different device and platform

❑Drag-and-drop elements to compose pages

❑Export project in different formats(Pdf, Png,..)

❑Navigate in the project's page

❑Share project with client

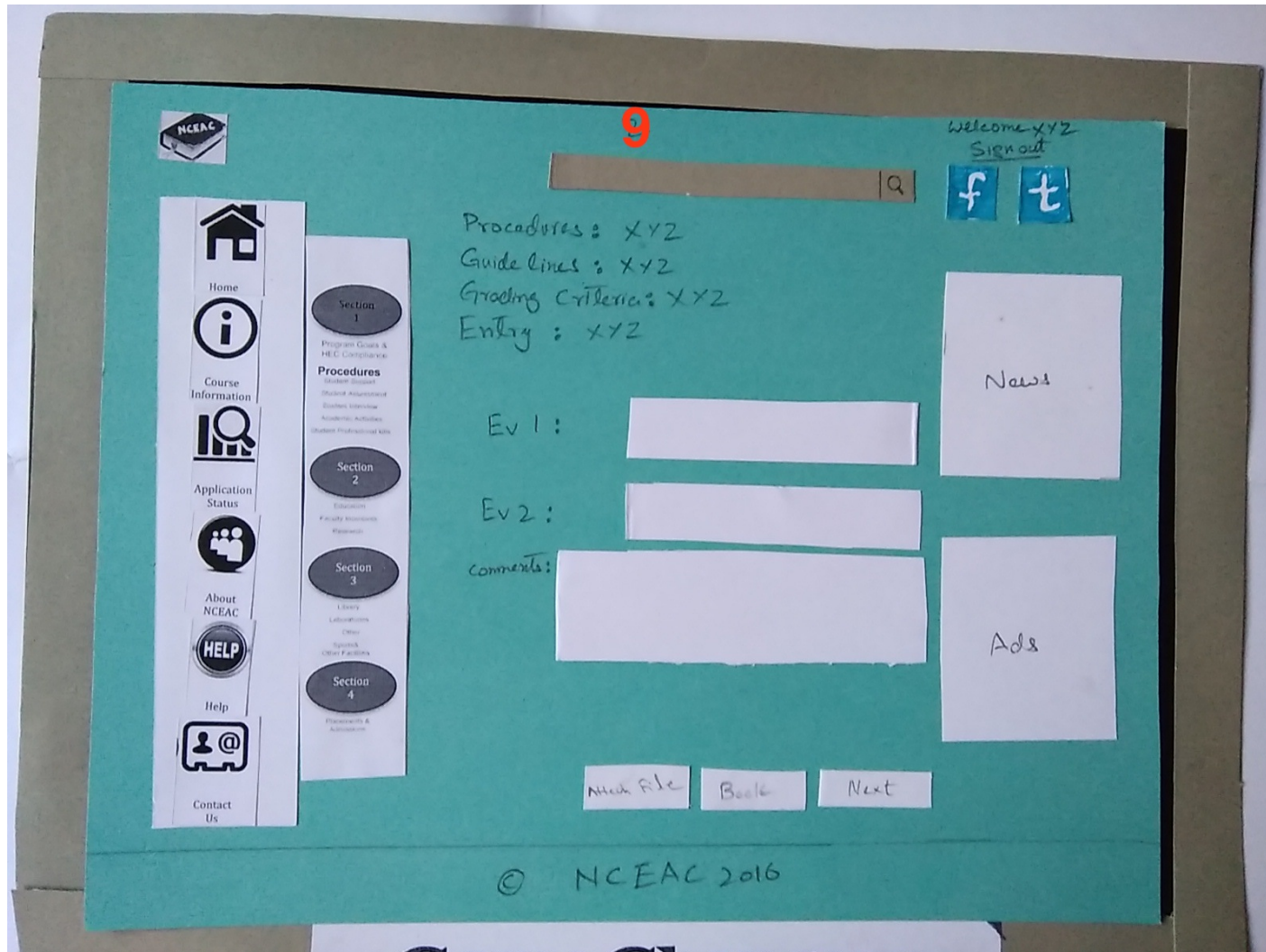❑Collect feedback and annotation

❑Add tasks for project members

Why Use Wireframes ?

❑Before making visual design you first make decisions about

the structure, content, layout etc.

❑Wireframes are tool to communicate these ideas.

❑Get everyone on the same page.

❑Wire frame are easier to change than design.

Wireframe Example

Mockup Example

Practical Examples:

❑**Mockups**

  ❑https://app.moqups.com

❑**Wireframes**

  ❑https://wireframe.cc/

Role Playing

❑ **Role playing allows the development team to experience the user world from the user's perspective by playing the role of the user.**

❑ **Role playing can be effective to address the following causes:**

  ❑ Many users cannot communicate the procedures they follow or the needs that must be addressed.

  ❑ Many users do not have the freedom to admit that they do not follow prescribed procedures, therefore what they tell you may or may not be what they actually do.

  ❑ Individual users may have patterns of work activity that requires workarounds or unique paths of implementation that may hide real problems.

  ❑ It is impossible for any developer to anticipate every question that must be asked or for users to know "what questions the developer should be asking"

Requirements Documentation

Requirements Documentation

❑Many people involved in a typical system

  ❑Users, developers, analysts, testers, Architect, etc.

❑All parties must reach agreement about what system is being built

❑It is unlikely that all user needs are going to be satisfied in any particular release

❑Inevitable communication problems inherent in a multiple-person effort demand that a written document be produced to which all parties can agree and refer

❑Documents that define the product to be built are typically called a requirements specification

  ❑The requirements specification for a system or application describes the external behavior of that system

Requirements Documentation

❑Requirements can rarely be defined in a single monolithic document

❑The system may be very complex.

❑The customers' needs are being documented prior to documenting detailed requirements.

❑The system may be a member of a family of related products.

❑The system being constructed satisfies only a subset of all the requirements identified.

❑Marketing and business goals need to be separated from the detailed product requirements.

Documents

❑**System requirements specification**

  ❑Defines requirements for the overall "system," including hardware, software, people, and procedures

❑**Vision document**

  ❑Defines the features of the system in general terms

❑**Product family requirements or Product family Vision document**

  ❑Defines the full set of requirements for a family of products

❑**Business requirements document, or marketing requirements document**

  ❑Describes the overall business requirements and business environment in which the product will reside

Documents

☐ **Software Requirements Specification**

   ☐ SRS for short

   ☐ Defines requirements in specific terms but for just the software piece

   ☐ Defines the external behavior of the system being built

   ☐ Defines requirements for just one specific application and for one specific release or a specific release of a specific application within the family

Business and Marketing Requirements

❑Product is developed by a technical world but marketed and used in business world.

❑We must consider factors such as among market windows, target markets, product packaging, distribution channels, functionality, marketing costs, resource availability, margins, ability to pay back over large numbers of copies sold, and so on

❑These requirements are captured in Marketing Requirements Document (MRD)

❑These requirements are not part of the requirements specifications.

MRD

- ❑ **Who is the customer?**
- ❑ **Who is the user?**
- ❑ **What markets do we intend to sell to?**
- ❑ **How are these markets segmented?**
- ❑ **Are the requirements of the users in these segments different?**
- ❑ **What classes of users exist?**
- ❑ **What need does the product satisfy?**
- ❑ **What kind of product is it?**
- ❑ **What is the product's key benefits; why should someone buy it?**
- ❑ **Who is the competition?**
- ❑ **What differentiates the product from the competition?**
- ❑ **In what environment will the system he used?**
- ❑ **What will the development cost be?**
- ❑ **At what price do you want to sell the product?**
- ❑ **How will the product be installed, distributed, and maintained?**

Vision Document

❑ **Combines into a single document abstract of both**

    ❑ a marketing requirements document and

    ❑ a product requirements document

❑ Describes the application in general terms, including descriptions of the target market, the users of the system, and the features of the application

❑ The single most important document in a software project, captures the needs of the user, the features of the system, and other common requirements for the project.

Vision Document

❑It defines a high level of abstraction of both the problem

and the solution.

Product Positioning Statement

❑**It is a short description of your target market and the**

product you provide to them.

Product Position Statement

For	*[target customer]*
Who	*[statement of the need or opportunity]*
The (product name)	*is a [product category]*
That	*[statement of key benefit; that is, the compelling reason to buy]*
Unlike	*[primary competitive alternative]*
Our product	*[statement of primary differentiation]*

For	ABC College students, professors, and the course registrar
Who	Attend, teach, or administer college courses
The Course Registration System	Is a tool
That	Enables online course registration and access to course and grade information
Unlike	The existing outdated mainframe registration system
Our product	Provides up-to-date information on all courses, registrations, teachers, and grades to all users from any PC connected via the College LAN or internet.

Stakeholder Profiles

Representative	John Whitewood, IT Department Head
Description	Approval Authority
Type	Understands the college's financial status, and the long term vision of the Board Of Governors.
Responsibilities	Represents the IT Department and the Board Of Governors. Monitor's project status, and has authority over budget approval. Ensures that the project meets short term and long term goals of the college. Plans for potential re-sale opportunities, and long term maintenance of the system.
Success Criteria	Success is completion of the project within approved budget, and a demonstrated reduction in registrar workload (and therefore reduced cost for the projected future). There must also be a general perception by the Board of Governors that the project meets user needs. The system should be easily modified for use by other colleges, for potential re-sale opportunities. The stakeholder is rewarded by receiving recognition by the Board of Governors.
Involvement	Management reviewer, Budgetary approval signatory, Involved in staff performance reviews.
Deliverables	None.
Comments / Issues	None.

Key stakeholders or user needs

Need	Priority	Concerns	Current Solution	Proposed Solutions
Student Course Registration	High	**Student Course Registration is slow and inefficient.**	Currently students must complete a course registration form and submit it to the Registrar. The Registrar takes up to 2 weeks to process the form and another week to send the confirmation back to the student. At this point, any schedule changes due to full courses or student preference require the entire three week process to be repeated. This provides students limited flexibility in selecting their schedule of courses.	Students would like to have online access to quickly determine course availability and assigned professors.
Early access to Student Grades	Medium	**Long delay to get grades, continuous queries to professors.**	The final report cards are typically mailed out to the students 8 weeks after the start of the examination period. During this time, students continually phone their professors in attempts to find out their marks sooner	Online access to individual course grades was a recommendation from most students completing the survey.
Low clerical costs	Medium	**Clerical effort is time intensive and costly.**	The Registrar and 2-3 temporary clerical hires take 400 – 500 hours each term to process the course registration paperwork. Much of this time is spent entering information into the main course registration database and then re-registering students into other courses to resolve schedule conflicts and course availability problems.	Student access to the course registration system would effectively reduce this effort to zero.

Vision Document for Release 1.0

❑In the case of a new product or application, probably every element of

the Vision document must be developed and elaborated.

❑**The Vision document must contain at least the following**

   ❑General users of the system and markets served

   ❑Features intended for release in version 1.0

   ❑Other requirements

      ❑such as regulatory and environmental

   ❑Future features

Vision Document for Release 2.0

❑ **The projects evolve**

   ❑ features become better defined

❑ **New features will be discovered**

❑ **New features discovered may be**

   ❑ scheduled for 2.0

   ❑ and some for future release

❑ **Record these in v2.0 of the Vision document either as**

   ❑ Scheduled for incorporation in 2.0 or as new future features.

❑ You may discover that some of the features implemented in version 1.0 did not deliver the intended value

❑ You will need to remove some features in the next release.

❑ As a result the document tends to grow

Delta Vision Document

❑**Requirement grows over time and it is quite natural**

❑**But, unfortunately, the document becomes more difficult to read and to understand over time**

❑**The Delta Vision document focuses primarily on what is new and what is different about this release.**

  ❑This focus on only what has changed is a primary learning technique and is extremely beneficial in dealing with complex systems of information

قبر کا عذاب

رسول اللہ صلی اللہ علیہ وسلم نے فرمایا: "اگر مجھے اس بات کا خوف نہ ہوتا کہ تم مردوں کو دفن کرنا بند کر دو گے، تو میں اللہ تعالیٰ سے یہ دعا کرتا کہ وہ تم کو عذاب قبر سنا دے جو میں سنتا ہوں"۔

پھر آپ صلی اللہ علیہ وسلم نے ہماری طرف متوجہ ہو کر فرمایا: جہنم کے عذاب سے اللہ کی پناہ طلب کرو، صحابہؓ نے کہا کہ ہم اللہ کی پناہ طلب کرتے ہیں۔ پھر آپ صلی اللہ علیہ وسلم نے فرمایا: تم عذاب قبر سے اللہ کی پناہ طلب کرو، صحابہؓ نے کہا کہ ہم جہنم کے عذاب سے اللہ کی پناہ طلب کرتے ہیں۔ پھر آپ صلی اللہ علیہ وسلم نے فرمایا: تم ظاہری و باطنی فتنہ سے اللہ کی پناہ طلب کرو، سب نے کہا کہ ہم ظاہری و باطنی فتنہ سے اللہ کی پناہ طلب کرتے ہیں۔ آپ صلی اللہ علیہ وسلم نے فرمایا تم دجال کے فتنہ سے اللہ کی پناہ طلب کرو، صحابہؓ نے کہا کہ ہم دجال کے فتنہ سے اللہ کی پناہ طلب کرتے ہیں۔