

# **User interface design**

**Week9: Discovering Requirements: what are requirements, data gathering for requirements, personas and scenarios**

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# outline

- ❖ Intended learning outcomes
- ❖ What are requirements
- ❖ Data gathering for requirements
- ❖ Personas and scenarios
- ❖ Capturing interaction with use cases

# Intended learning outcomes

- ❖ Differentiate between various types of requirements.
- ❖ Understand the importance of stakeholder involvement in the requirements gathering process.
- ❖ Learn how to create and use personas as representative user prototypes to guide decision-making.
- ❖ Understand how scenarios aid in the design and testing phases by providing a real-world.

# Introduction

- ❖ Discovering requirements focuses on exploring the problem space and defining what will be designed.
- ❖ It includes understanding people who may use the product and their capabilities; how a new product might support people in their daily lives; people's current tasks, goals, and contexts; and constraints on the product's performance.
- ❖ This understanding forms the basis of the product's requirements and underpins design and construction.

- ❖ It may seem artificial to distinguish between requirements, design, and evaluation activities because they are so closely related, especially in an iterative development cycle.
- ❖ In practice, they are all entangled, with some design taking place while requirements are being discovered and the design is evolving through a series of evaluation redesign cycles.
- ❖ However, each of them has a different emphasis and specific goals, and each of them is necessary to produce a quality product.

# What Is the Purpose of the Requirements Activity?

- ❖ The requirements activity sits in the first two phases of the double diamond of design.
- ❖ These two phases involve exploring the problem space to gain insights about the problem and establishing a description of the design challenge to be addressed.
- ❖ The purpose of the requirements activity is to ensure that the project team has a clear understanding of the needs and expectations of the stakeholders.

- ❖ Requirements may be discovered through specific requirements activities, or during product evaluation, prototyping, design, and construction.
- ❖ Requirements discovery is iterative, and the iterative cycles ensure that the lessons learned from any of these activities feed into each other.
- ❖ Requirements evolve and develop as the stakeholders interact with designs and learn what is possible and how features can be used.

# How Can Requirements Be Captured Once They Are Discovered?

- ❖ Requirements may be captured in several different forms and at varying levels of detail depending on the type of application.
- ❖ Interactive products span a wide range of domains with differing constraints and user expectations, and the notations used to capture requirements need to reflect this.
- ❖ For some products, such as an exercise monitoring app, it may be sufficient to develop a range of prototypes together with product descriptions.

- ❖ For others, such as a factory's process control software, a more detailed understanding of the required behavior is needed before prototyping begins, and a structured notation may be used.
- ❖ This means that a diversity of both physical and digital representations is used including prototypes, stories, diagrams, and photographs, as appropriate for the product under development.

# Why Are Requirements Important?

- ❖ One of the goals of interaction design is to produce usable products that support the way people communicate and interact in their everyday and working lives.
- ❖ Discovering and communicating requirements helps to advance this goal, because defining what needs to be built supports technical developers and allows stakeholders to contribute more effectively.

- ❖ User-centered design with repeated iteration and evaluation along with stakeholder involvement can help mitigate against misunderstandings.
- ❖ The process of discovering requirements also promotes communication between all parties and hence a common understanding.
- ❖ Miscommunication and misunderstanding can easily occur if requirements are assumed or are left implicit.

# What Are Requirements?

- ❖ A requirement is a statement about a product that specifies what it is expected to do or how it will perform.
- ❖ For example, a requirement for a smartwatch GPS app might be that the time to load a map is less than half a second.
- ❖ Requirements may also be expressed at different levels of abstraction, so another, less precise requirement might be for teenagers to find the smartwatch appealing.

# Different Kinds of Requirements

- ❖ Requirements come from several sources: from the user community, from the business community, or as a result of the technology to be applied.
- ❖ Two different kinds of requirements have traditionally been identified:
  - ❖ Functional requirements, which describe what the product will do
  - ❖ Nonfunctional requirements, which describe the characteristics of the product.

- ❖ For example, a functional requirement for a new video game might be that it will be challenging for a range of abilities.
- ❖ A nonfunctional requirement for this same game might be that it can run on a variety of platforms, such as the Microsoft Xbox, Sony PlayStation, and Nintendo Switch game systems.
- ❖ Interface design involves understanding both functional and nonfunctional requirements.

# Common types of requirements

- ❖ Functional
- ❖ Data
- ❖ Environment
- ❖ User
- ❖ Usability
- ❖ User experience

# Functional requirements

- ❖ This capture what the product will do.
- ❖ For example, a functional requirement for an automated industrial assembly plant might be that an operator can program the assembly line to identify, manipulate, and weld together the correct pieces of metal accurately.
- ❖ Understanding the functional requirements is fundamental for all products.

# Data requirements

- ❖ Data requirements capture the type, volatility, size/amount, persistence, accuracy, and value of the required data.
- ❖ All interactive products have to handle some data.
- ❖ For example, if an application for buying and selling stocks and shares is being developed, then the data must be up-to-date and accurate, and it is likely to change many times a day.
- ❖ In the personal banking domain, data must be accurate and persist over many months and probably years, and there will be plenty of it.

# Environmental requirements

- ❖ Environmental requirements, or context of use, refer to the circumstances in which the interactive product will operate.
- ❖ Four aspects of the environment lead to different types of requirements.
- ❖ First is the physical environment, such as how much lighting, noise, movement, and dust is expected in the operational environment, will workers need to wear protective clothing, such as large gloves? How crowded is the environment?.

- ❖ The second aspect of the environment is the social environment. For example, will data need to be shared? If so, does the sharing have to be synchronous or asynchronous?
- ❖ The third aspect is the support environment. For example, what kind of assistance will be needed to use the product and how easily can it be obtained, how much training or help will be readily available, and what level of help can be provided automatically?
- ❖ These issues need to be explored during the requirements activity, and there are user experience implications in choosing one solution or another

❖ Finally, the technical environment will need to be established. For example, what technologies will the product run on or need to be compatible with, and what technological limitations might be relevant?

# User requirements

- ❖ These capture key attributes of potential users, such as their abilities and skills, and perhaps their educational background, preferences, personal circumstances, physical or mental disabilities, and so on.
- ❖ In addition, someone may be a beginner, an expert, a casual user, or a frequent user. This affects the ways in which interaction is designed.
- ❖ For example, a beginner user may prefer step-by-step guidance, An expert, on the other hand, may prefer a flexible interaction with more wide-ranging powers of control.

# Usability and user experience requirements

- ❖ These are requirements that should be captured together with appropriate measures.
- ❖ This both ensures that usability is given due priority and facilitates progress tracking.
- ❖ The same is true for user experience goals, although it is harder to identify quantifiable measures that track them.
- ❖ Considering each of these kinds of requirements is a starting point to discovering the requirements for a particular product, but it is a high-level perspective that will need to be refined.

# Data Gathering for Requirements

- ❖ Data gathering for requirements covers a wide spectrum of issues, including who might use the product, the activities in which they are currently engaged and their associated goals, the context in which the activities are performed, and the rationale for the way things are.
- ❖ The three data gathering techniques i.e. interviews, observation, and questionnaires, are commonly used throughout the interaction design lifecycle.
- ❖ In addition to these techniques, several other approaches are used to discover requirements.

# Using Probes to Engage with Stakeholders

- ❖ Probes come in many forms and are an imaginative approach to data gathering.
- ❖ They are designed to prompt participants into action, specifically by interacting with the inquiry in some way, so that researchers and designers can learn more about them and their contexts.
- ❖ Probes, are essentially sets of open-ended tasks or activities that are provided to stakeholders to elicit information, insights, and feedback about their needs, preferences, and the context in which they will use the interface.

# Examples of probes

- ❖ What are your top priorities for the future of our organization?
- ❖ What are the biggest challenges that we face as an organization?
- ❖ What are your thoughts on the proposed changes to our products or services?
- ❖ What are your experiences with our organization?
- ❖ What are your expectations of us?
- ❖ How can we improve our communication with you?

# Contextual Inquiry

- ❖ Contextual inquiry is a user research method that involves observing users in their natural environment and asking them questions to understand how they use products and services.
- ❖ It is a valuable tool for gathering data for interface design, as it allows designers to see how users interact with interfaces firsthand and to identify their needs and pain points.
- ❖ The contextual inquiry has four parts: obtaining an overview, the transition, the main interview, and the wrap-up.

# Examples of how contextual inquiry can be used

- ❖ A designer could observe doctors using a medical software application to identify their needs and pain points.
- ❖ A designer could observe retail workers using a point-of-sale system to understand how they process transactions and to identify opportunities for improvement.
- ❖ A designer could observe students using a learning management system to understand how they complete assignments and to identify ways to make the system more user-friendly.

# Brainstorming for Innovation

- ❖ Requirements will be underpinned by the data gathered, but the requirements activity is also likely to involve some innovation.
- ❖ Brainstorming is a generic technique used to generate, refine, and develop ideas.
- ❖ It is widely used in interaction design to explore the problem space and generate alternative designs or for suggesting new and better ideas to support people in their everyday and working lives.

# Rules of brainstorming

- ❖ **Quantity over quality:** This encourages divergent thinking. The more ideas that are generated, the more there are to consider merging, developing, and refining.
- ❖ **Criticisms should be withheld:** This encourages people to focus on generating ideas and not worry about coming up with anything “dumb.”

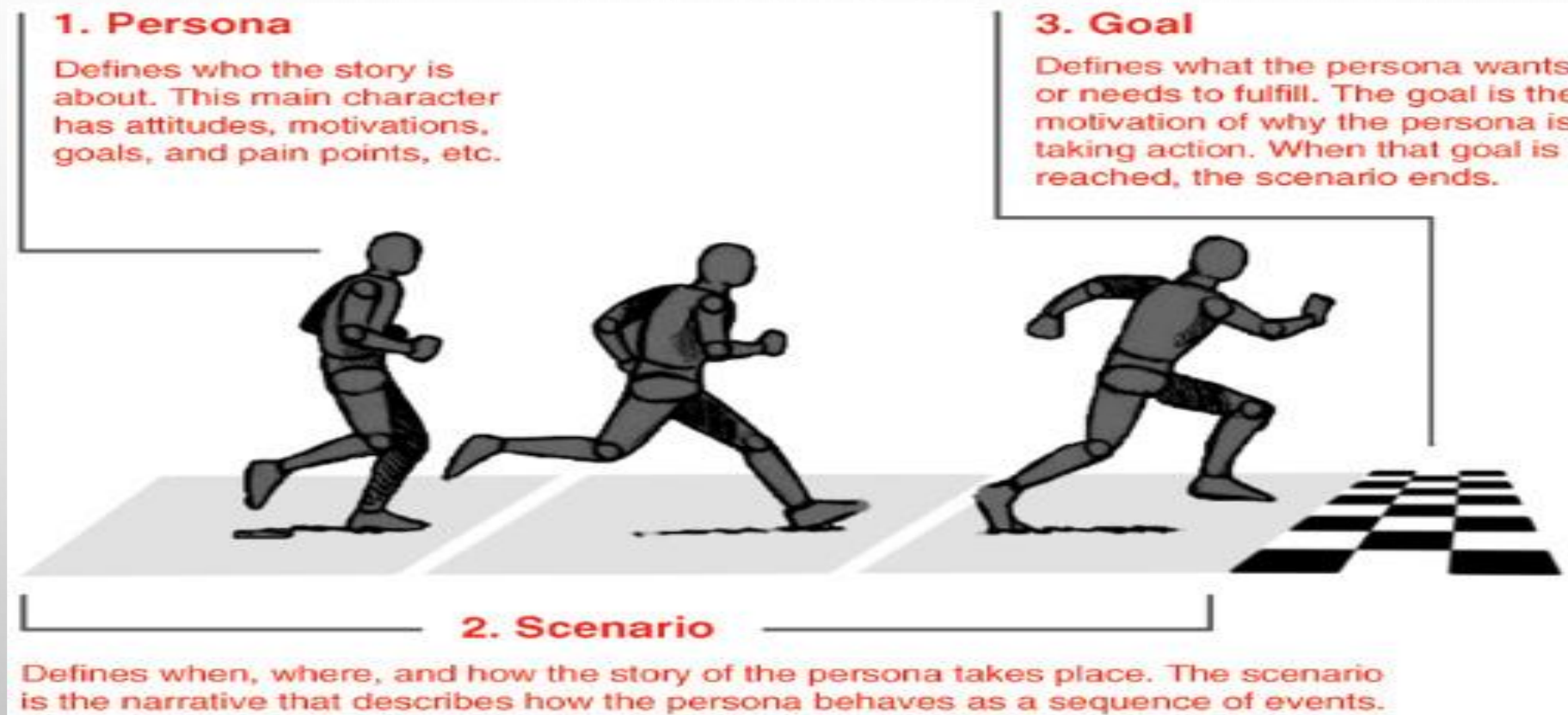
- ❖ **Encourage out-of-the-box thinking:** This encourages untraditional ideas. Even if the ideas are obviously impractical from the start, they may trigger other thoughts and generate ideas that would not have been considered without that prompt.
- ❖ **Combine, refine, and improve ideas:** This encourages convergent thinking. Ideas are considered, combined, modified, and fused to produce novel insights and even more ideas.

# Personas and Scenarios

- ❖ This is a user-centered design approach that helps design teams better understand and address user needs, motivations, and goals.
- ❖ Personas and scenarios are two key elements of this approach, and they work together to create a vivid and user-focused picture of the design requirements.
- ❖ Both can be improved with other representations such as prototypes, working systems, screenshots, conversations, acceptance criteria, diagrams, documentation, and so on.

- ❖ A persona characterizes someone who might use the product while a scenario describes one use of a product or one example of achieving a goal.
- ❖ Developing distinctive personas and scenarios can be difficult at first, and it is common for initial narratives to conflate details of the person with details of the scenario.
- ❖ Combining personas and scenarios makes them complement each other and bring realistic detail that allows the design team to explore current activities, future use of new products, and futuristic visions of new technologies.

# Relationship between personas and scenarios



**Figure1: The relationship between a scenario and its associated persona (Yvonne Rogers, 2023, P.427)**

# Personas

- ❖ A persona is a way to model, summarize and communicate research about people who have been observed or researched in some way.
- ❖ A persona is depicted as a specific person but is not a real individual; rather, it is synthesized from observations of many people.

- ❖ Each persona represents a significant portion of people in the real world and enables the designer to focus on a manageable and memorable cast of characters, instead of focusing on thousands of individuals.
- ❖ Personas aid designers to create different designs for different kinds of people and to design for a specific somebody, rather than a common everybody.

# What Does A Persona Look Like?

- ❖ While a persona is usually presented as a one-pager document, it is more than just a deliverable it is a way to communicate and summarize research trends and patterns to others.
- ❖ This fundamental understanding of users is what's important, not the document itself.

# Where Does The Concept Of Personas Come From?

- ❖ Understanding the historical context and what personas meant to their ancestor will help us understand what personas can mean to us designers.
- ❖ Personas were informally developed by Alan Cooper in the early '80s as a way to empathize with and internalize the mindset of people who would eventually use the software he was designing.
- ❖ Alan Cooper interviewed several people among the intended audience of a project he was working on and got to know them so well that he pretended to be them as a way of brainstorming and evaluating ideas from their perspective.

- ❖ This method-acting technique allowed Cooper to put users front and center in the design process as he created software.
- ❖ As Cooper moved from creating software himself to consulting, he quickly discovered that, to be successful, he needed a way to help clients see the world from his perspective, which was informed directly by a sample set of intended users.

- ❖ This need to inform and persuade clients led him to formalize personas into a concrete deliverable that communicates one's user-centered knowledge to those who did not do the research themselves.
- ❖ The process of developing personas and the way in which they are used today have evolved since then, but the premise remains the same.

# Components of goal-directed design that support personas

- ❖ **End goal(s).** This is an objective that a persona wants or needs to fulfill by using software. The software would aid the persona to accomplish their end goal(s) by enabling them to accomplish their tasks via certain features.
- ❖ **Scenario(s).** This is a narrative that describes how a persona would interact with software in a particular context to achieve their end goal(s). Scenarios are written from the persona's perspective, at a high level, and articulate use cases that will likely happen in the future.

- ❖ Personas, end goals and scenarios relate to one another in the same way that the main character in a novel or movie goes on a journey to accomplish an objective.
- ❖ The classic “hero’s journey” narrative device and its accompanying constructs have been appropriated for the purpose of designing better software.

# How Are Personas Created?

Personas can be created in a myriad of ways, but designers are recommended to follow this general formula:

- ❖ Interview and/or observe an adequate number of people.
- ❖ Find patterns in the interviewees' responses and actions, and use those to group similar people together.

- ❖ Create archetypical models of those groups, based on the patterns found.
- ❖ Drawing from that understanding of users and the model of that understanding, create user-centered designs.
- ❖ Share those models with other team members and stakeholders.

# What Are Personas Used For?

- ❖ Personas can and should be used throughout the creative process, and they can be used by all members of the software development and design team and even by the entire company.
- ❖ **Build empathy.** When a designer creates a persona, they are crafting the lens through which they will see the world. With those glasses on, it is possible to gain a perspective similar to the user's.
- ❖ From this vantage point, when a designer makes a decision, they do so having internalized the persona's goals, needs and wants.

- ❖ **Develop focus.** Personas help us to define who the software is being created for and who not to focus on. Having a clear target is important.
- ❖ For projects with more than one user type, a list of personas will help you to prioritize which users are more important than others.
- ❖ **Communicate and form consensus.** More often than not, designers work on multidisciplinary teams with people with vastly different expertise, knowledge, experience and perspectives.
- ❖ As a deliverable, the personas document helps to communicate research findings to people who were not able to be a part of the interviews with users.

- ❖ **Make and defend decisions.** Just as personas help to prioritize who to design for, they also help to determine what to design for them. When you see the world from your user's perspective, then determining what is useful and what is an edge case becomes a lot easier.
- ❖ **Measure effectiveness.** Personas can be stand-in substitutions for users when the budget or time does not allow for an iterative process. Various implementations of a design can be “tested” by pairing a persona with a scenario, similar to how we test designs with real users.

# Scenarios

- ❖ Scenarios are a way that we have to understand what users want, how they feel and what they want from the product.
- ❖ It's all about helping the design team put themselves in the user's shoes, encouraging empathy.
- ❖ On a more practical side, a scenario tends to include who the user is and what their goal is at that moment.
- ❖ Generally, scenarios are concise and represent a snapshot of the user experience.

# Importance for scenarios

They allow us to understand what users want and how they feel

It clarifies what the true objectives of users are

Concise and focus on one part of the experience

They foster empathy with users

- ❖ Many design teams believe the main advantage of having scenarios is that once we establish what the user's goal is, it becomes easier to define how the user would go about reaching that goal.
- ❖ There are different takes on scenarios, with some designers going for more task-focused scenarios while others prefer a more complete and detailed scenario.
- ❖ The right fit for you will depend on how much you know about your users, and how you prefer to organize all that information.

# Benefits of user scenarios

Provide us with  
information about  
the users needs and  
wishes

Give us the correct  
context of use

Take us after the  
real steps of users  
when performing a  
task

Allow to validate  
aspects of the design  
that we could have  
looked

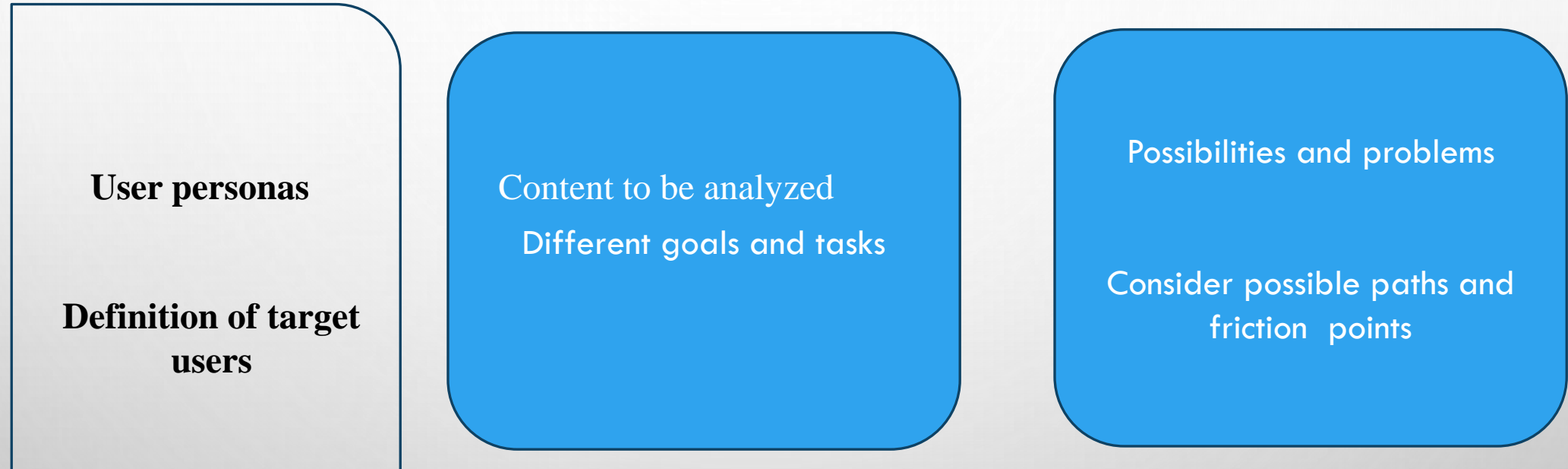
# What does a scenario look like?

- ❖ Scenarios are useful for designers because they can spark ideas, generate features and help refine any requirements going forward.
- ❖ They are also crucial when it comes to usability testing. With user scenarios and a professional wireframe tool, designers can make sure they cover all their bases and validate every move users make in the product.
- ❖ Another interesting characteristic of scenarios is that they give us a bit of context related to the user and how they would come to use the product.

# How to write a scenario

- ❖ Scenarios can vary from company to company.
- ❖ We've gone through some of the things they can include and their main function within a design project but how can we write one from zero?
- ❖ Before you can actually write anything about the possible scenario, there's a fair amount of user research needed.
- ❖ Most teams tend to have a clear user persona (or two) before they start creating user scenarios, for example.

# How to write a scenario



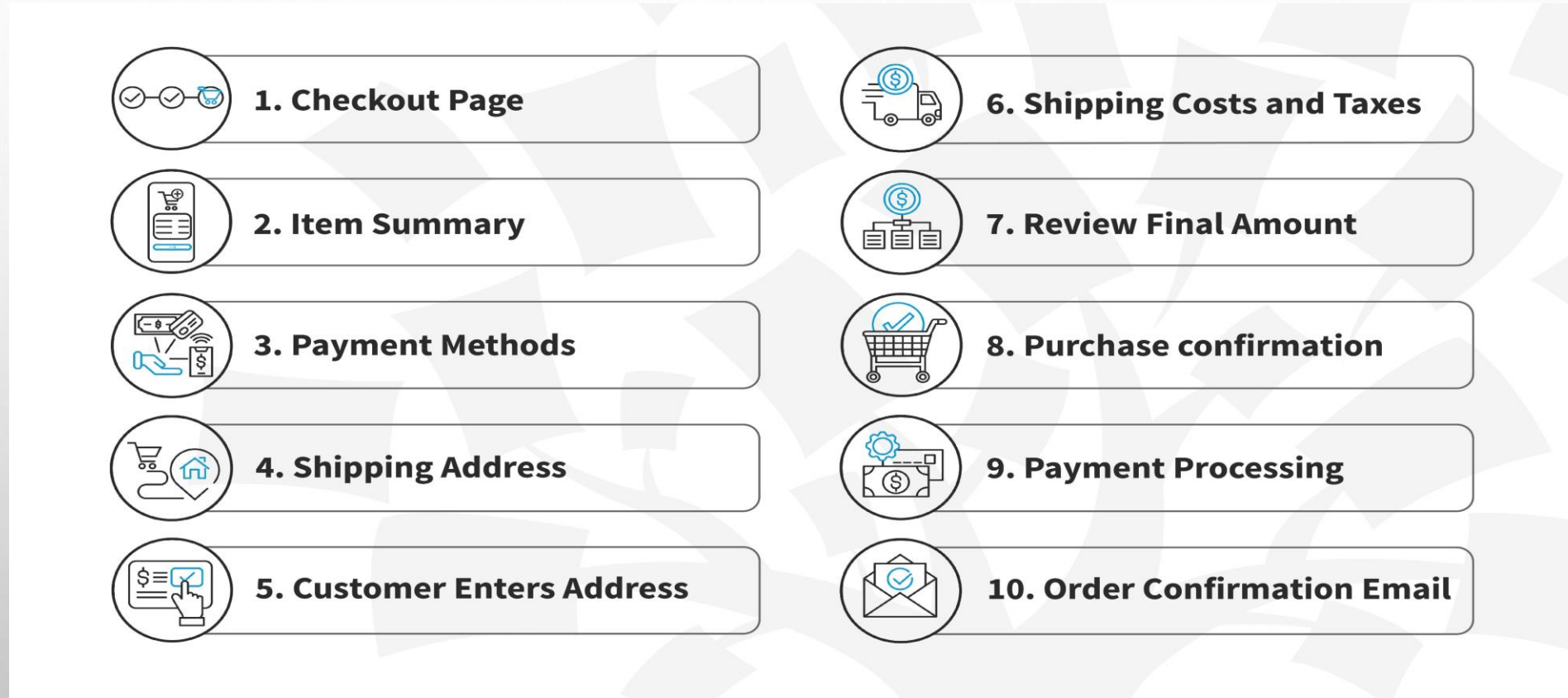
- ❖ The process of writing user scenarios can be described as scenario mapping.
- ❖ This means that in order to have a realistic user scenario, the design team has to consider the possible goals and tasks, along with what that means for the user experience.
- ❖ This process doesn't have to be complex but it does require a lot of consideration on possible scenarios and outcomes.
- ❖ Here's a few things you can find in user scenarios:

- ❖ Who the user is
- ❖ The situation that drives users to seek the product
- ❖ A specific task or goal the user has
- ❖ Information regarding user's income and spending
- ❖ The path to completion of a task
- ❖ Points of friction or stress in daily life or in the user experience

# Capturing Interaction with Use Cases

- ❖ A use case refers to situations that outline how a user interacts with a product or service.
- ❖ Each use case starts with a user goal and ends when the system fulfills that goal.
- ❖ The use case details this process through simple and active steps
- ❖ Understanding use cases shapes the user experience, as you can explore user behavior by creating specific use cases.

# Examples of use cases



**Figure 2: checkout page (The Interaction Design Foundation, 2023)**

# Benefits of Incorporating Use Cases

## Reduces Development Costs

- ❖ Knowing the user's needs upfront prevents costly rework later in the software development. Take an online grocery store as an example.
- ❖ If the use case indicates a "quick checkout," developers can implement this feature from the start. This avoids the financial burden of having to modify the system later on.

## **Improves User Satisfaction**

- ❖ Use cases cover all eventualities that users might encounter when using a product. Because of this, solutions designed with comprehensive use cases are more likely to be robust and usable.

## **Enhances Team Collaboration**

- ❖ When everyone understands the use cases, there's a unified vision. Imagine a team working on a fitness app. Knowing the key use case is "easy tracking of workouts," designers and developers align their tasks.

# Elements of a Use Case

- ❖ **Actor:** In system design, this is a role such as customer. In user experience design, it would be a persona who acts on the system.
- ❖ **Goals:** You want your actor to achieve these objectives with the product.
- ❖ **Actions:** These are the steps the user needs to take to reach the particular goal along with the system response.

- ❖ **Basic (Success) Flow:** This is the ideal sequence where the user achieves the goal without issues.
- ❖ **Exception Flow:** Covers situations where the user can't achieve the goal.
- ❖ **Alternative Flow:** Outlines other routes a user might take to reach the goal.

# The Process of Creating Use Cases

## Identify Target User Groups

- ❖ The first step is to perform user research and identify who will use the app. Are they business owners, digital marketers? Creating user personas and knowing your target audience shape the features and functionalities to focus on.

## Define Goals and Objectives

- ❖ You want your person to achieve specific goals and objectives. Thus, you need to define them while you create your use cases.

## **Create Wireframes, Mockups, or Prototypes**

- ❖ Create wireframes, mockups, or prototypes using UX design tools like Sketch, Adobe XD, or Figma based on the defined actions and flows.

## **Conduct Usability Testing**

- ❖ After creating a wireframe or prototype, conduct usability tests. These tests should involve personas performing the goals identified in your use cases.

# Tips for Creating Use Cases

## **Start with User Goals**

- ❖ Always begin by identifying what the user aims to achieve. A clear understanding of user objectives forms the backbone of your use case.

## **Involve Stakeholders Early**

- ❖ Consult key stakeholders such as users, product managers, and developers early. This helps in identifying real-world needs and constraints.

## **Use Simple Language**

- ❖ You should use straightforward and easy-to-understand language. Simple language ensures team members can grasp the concept even with limited technical knowledge.

## **Apply Service Design Principles**

- ❖ Keep broader service design principles in mind while you create the use cases. This ensures each use case contributes positively to the user's overall experience.

## **Be Consistent**

- ❖ Maintain uniform symbols, terminology, and flow throughout your use cases. Consistency allows for easier understanding and interpretation.

## **Prioritize Modularity**

- ❖ Design your use cases as modular units. This approach makes them easier to update, review, and manage. Modularity also makes it simpler to handle complex scenarios by breaking them down into smaller, more manageable pieces.

## **Iterate and Revise**

- ❖ Requirements may change, and initial designs can have flaws. Make it a habit to revisit and revise your use cases.

## **Document Clearly**

- ❖ Each use case should have clear documentation outlining its purpose, main and alternative flows, and any preconditions or triggers.

## **Review with Team**

- ❖ Before finalizing, review the use case with your development team. This should be straightforward if you have collaborated with developers during their creation.

## **Test Scenarios**

- ❖ Once you develop the use case, run test scenarios to validate its effectiveness and accuracy. Testing helps ensure that all paths lead to the desired outcomes and meet the user's goals while adhering to system constraints.

# Common Pitfalls and Challenges

❖ Designing use cases can be a challenging process. Below are some common pitfalls and challenges that you may encounter, along with real-life examples to clarify these issues:

## Overlooking User Goals

❖ Challenge: Failing to center the use case on actual user goals can lead to designs that are functionally rich but user-poor. This should not happen with good user research!

## **Excessive Complexity**

- ❖ Challenge: Making a use case too complex can obscure its purpose and make it difficult to implement.

## **Ignoring Alternative Flows**

- ❖ Challenge: Focusing only on the main user flow and ignoring alternative or 'edge' cases.

## **Inadequate Stakeholder Involvement**

- ❖ Challenge: Not involving key stakeholders early and throughout the process.

## **Inconsistent Terminology**

❖ Challenge: Using inconsistent names, labels, or icons, which can confuse users.

## **Ignoring Technical Constraints**

❖ Challenge: Overlooking what is technically feasible can lead to impractical use cases. For user-centered solutions, the user experience and development teams must work together.

## **Failure to Update**

❖ Challenge: Not revisiting and updating use cases to align with changing user needs or business goals.

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Thank you

Next Lecture We Shall Look At

Prototyping and construction