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METHODOLOGY FOR BUILDING A HCI

Academic Year 2024-2025

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INTRODUCTION

- The objective of the HMI is to create systems:
  - **useful** (adapted to needs); and
  - **usable (**adapted to users**)**

REALISATION OF USEFUL SYSTEMS

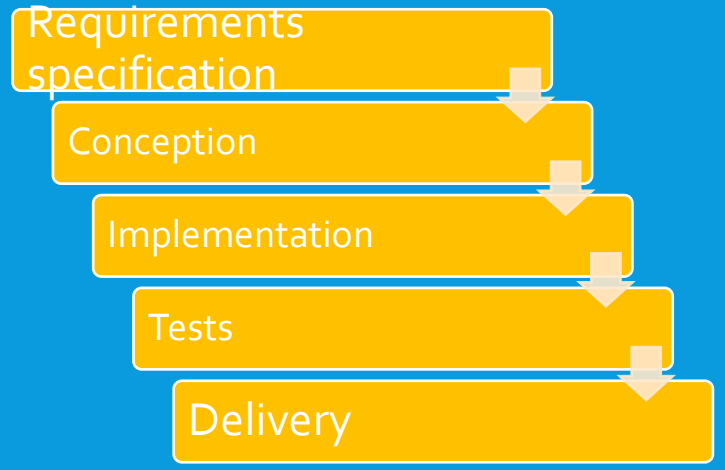
- There is no single magic model for developing all types of software
- Software engineering offers various software design models, each model is adapted to its working environment:
  - Predictive model
  - Iterative model
  - Incremental model
  - Agile methods

PROJECT MANAGEMENT MODELS

- **Predictive models**
- Predictive models detail the scope of the project from the start, that is, one can foresee what will happen until the end of the project.
- This type of model is preferable in an environment with a high degree of certainty about what the project should deliver. It does not work well in an environment with many changes or uncertainties.
- This model can be manifested in two applications:
  - waterfall projects and
  - projects following a V-cycle.

PREDICTIVE WATERFALL MODEL

- This predictive model where all the major phases of a project are carried out in order:

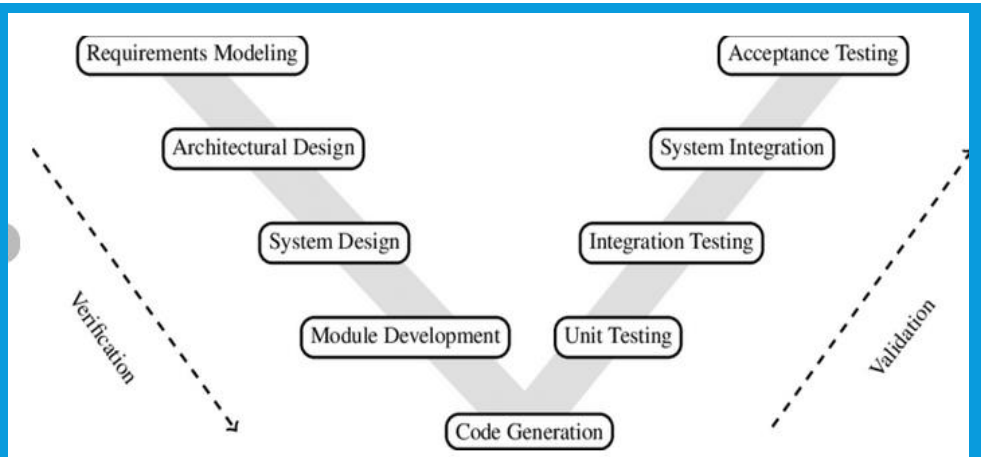


If a good level of initial conditions is met --> predefined deliverables are achieved (within the specified budget and time from the outset)

The issue is that since the initial conditions are rarely met, the final product does not meet the needs.

PREDICTIVE MODEL: THE V-CYCLE

- This model is an evolution of the waterfall model.
- This modelling reads horizontally:
  - The analysis of needs will allow for the creation of acceptance test cases,
  - The drafting of specifications will allow for the description of validation tests,
  - Architectural design will facilitate the definition of integration tests,
  - The detailed design will be associated with the creation of unit tests.

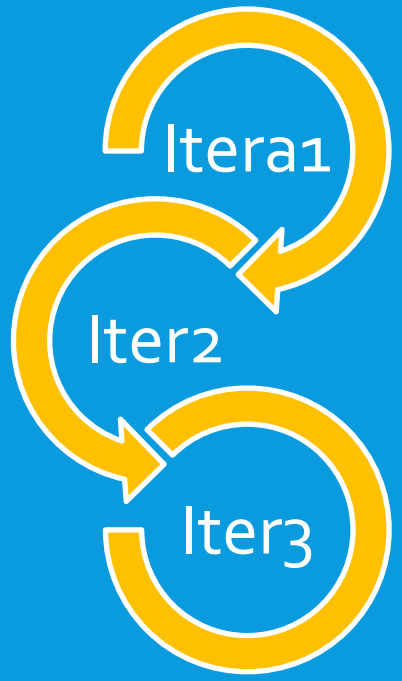


1: The V Model for the software development life cycle.

- Despite acceptance testing from the start, one can still only realise at the end that the needs do not meet those of the users.

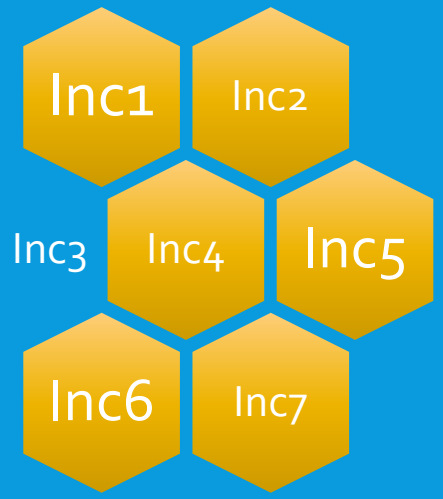
ITERATIVE MODEL

- Iterative models are those that repeat the life cycle several times until the final product is obtained,



INCREMENTAL MODEL

Incremental models aim to create the final product by successively adding increments of functionality until the finished product is achieved.



This model is generally used for complex projects that can be broken down.

AGILE METHODS

- They propose the delivery of products, highlighting the return on investment of changes made while strongly involving end users in the development of solutions.
- The principles of Agile methods are described in the Agile Manifesto:
- The Agile Manifesto describes four fundamental values to prioritise:
  - Individuals and their interactions over processes and tools
  - Working software over comprehensive documentation
  - Collaboration with customers over contract negotiation
  - Responding to change over following a plan

GENERAL PRINCIPLES OF AGILE METHODS:

General principles

1. Flexible, iterative, and incremental design methods
2. Project fragmented into several sub-parts (continuous delivery of high-value features)
3. Definition of adjustable short-term goals (adaptation to change)
4. Early evaluations: daily collaboration with users and developers
5. At regular intervals, the team adjusts its behaviour to become more effective

PROBLEMS

- **Some common issues:**
  - functions that do not meet the real needs of customers (usability); or
  - it is difficult or impossible to access system functions (usability).
- **Some causes of these problems:**
  - the ignorance of principles derived from cognitive theories;
  - the ignorance of the context of use;
  - a poor understanding of the tasks of the target user;
  - a poor integration of human concerns into the software engineering development process.

 think about user interface design methods

USER INTERFACE DESIGN METHODS

Characteristics

- user-centred
  - to truly take users into account, not just the client
- Prototyped
  - to quickly show ideas/projects/results
- with early evaluation
  - to consider user feedback / errors
- progressive: iterative, incremental
  - to improve proposals

USER INTERFACE DESIGN METHODS

Characteristics:

- **user-centred**
- **Prototyped**
- **early evaluation**
- **progressive**

USER MODEL: HUMAN ASPECTS

- The role of the user model is to identify the characteristics of typical users and guide design choices.
- It aims to:
  - reduce execution and interpretation distances and
  - identify users' semantic and syntactic needs.

- Access to users and the choice of representative users is rarely straightforward

USER-CENTRED DESIGN METHOD

- **Principle**
  - ➢ study of the user, their task and interaction from the analysis phase

- **Adapted**
  - ➢ when there is already a solution in place

- **Role of users**
  - user observed in task resolution
  - questioned about their expectations
  - interrogated about the designed software

PARTICIPATORY DESIGN METHOD

- **Principle**
  - only users truly know the tasks
  - they can also be a source of innovations
- Adapted
  - to loosely defined, innovative projects
  - to complex tasks that are difficult to grasp
- Role of users
  - user as a full design partner
  - participates in design choices

CONSIDERING THE USER: INFORMATIVE DESIGN METHOD

- Principle
  - intermediate method between user-centred design and participatory design

- Adapted
  - to innovative projects
  - method devised for working with children

- Role of users
  - user in the design team
  - without being considered a design partner
  - without participating in the final choices

METHODS FOR DESIGNING A USER INTERFACE

Characteristics:

- **user-centred**
  - **Prototyped**
- **early evaluation**
- **progressive**

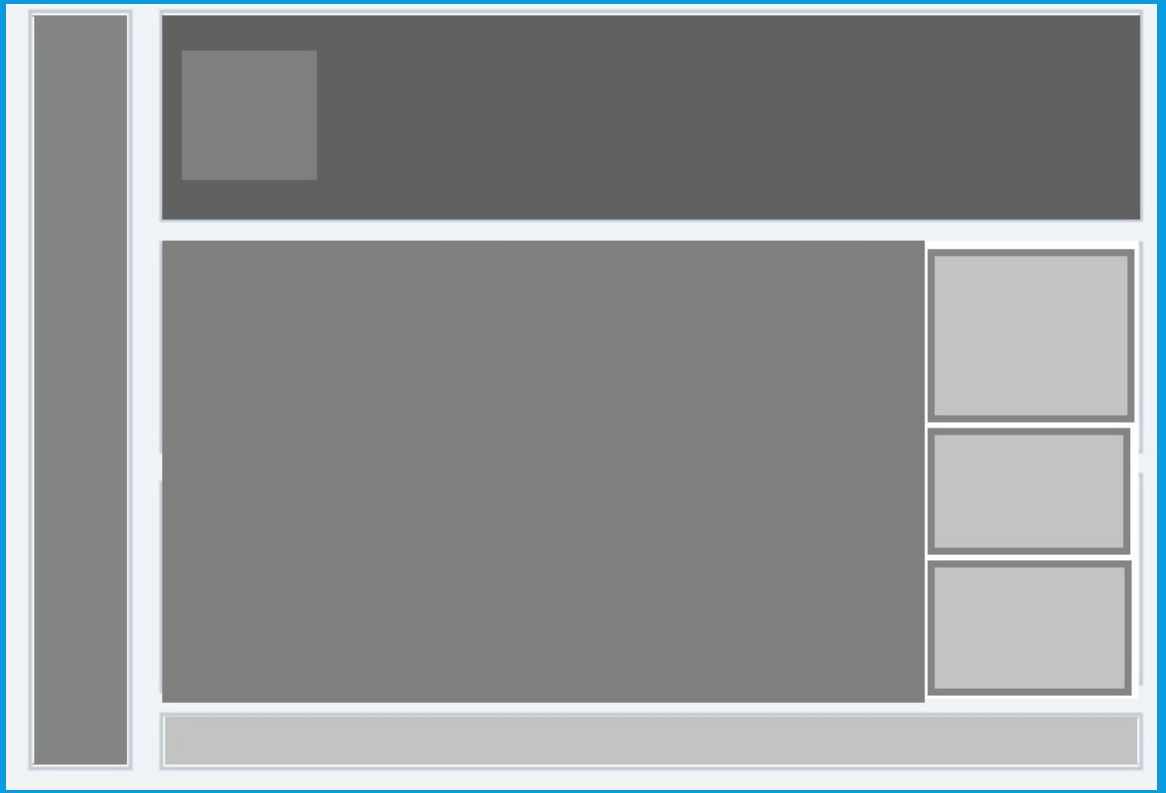
CHARACTERISTICS OF THE PROTOTYPED USER INTERFACE DESIGN

- Zoning Wireframe mockup prototype

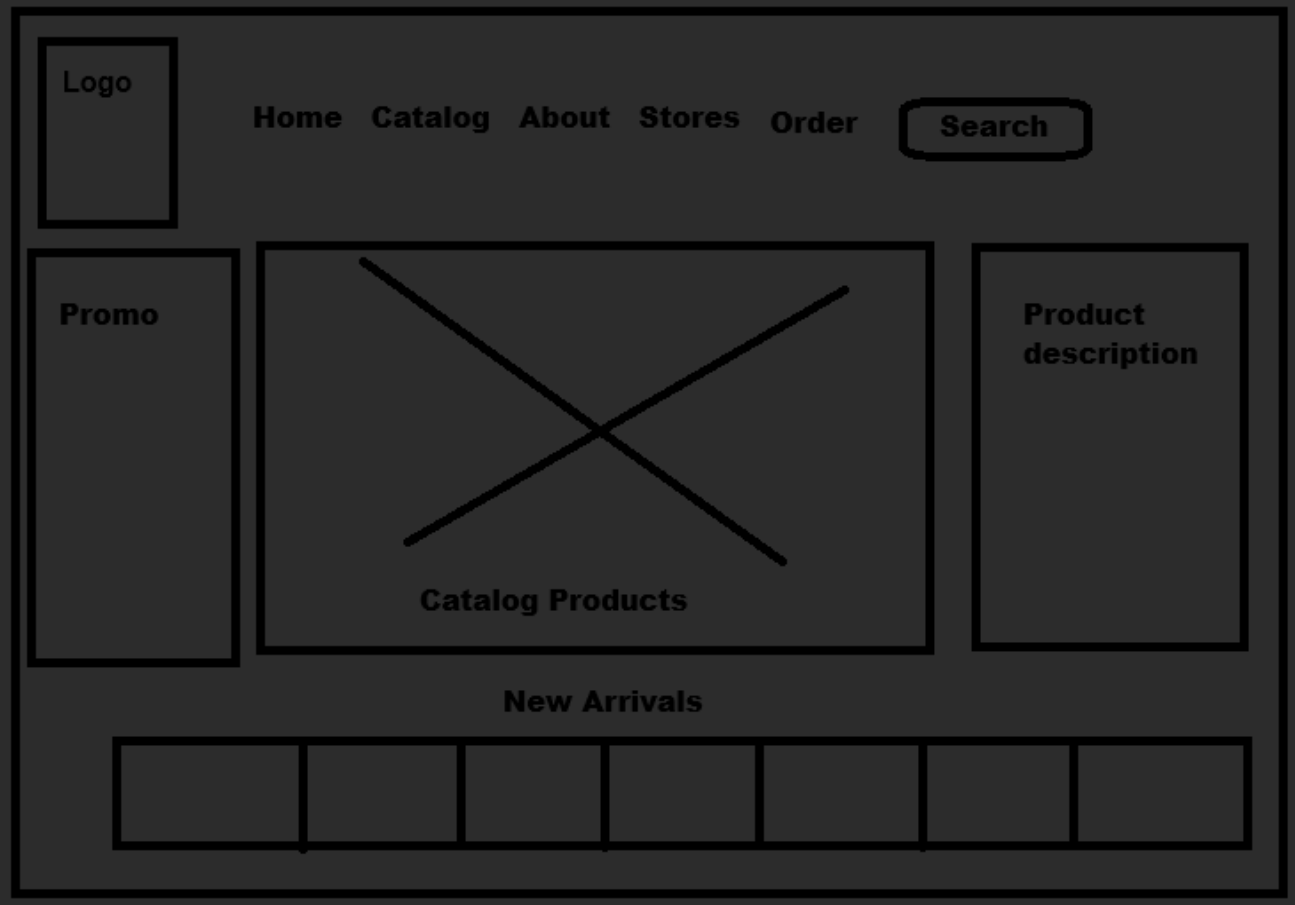
- **Principles**
  - partial representation of a system under development (BEFORE development)
  - allowing certain aspects to be tested with clients/users

CHARACTERISTICS OF THE PROTOTYPED USER INTERFACE DESIGN: ZONING

- **Zoning:**
  - Zoning represents the visual segmentation of functionality into several areas of a page based on needs. To give coherence to the interface
  - a different colour code is used to indicate the visual hierarchy among the blocks, namely the most important areas



CHARACTERISTICS OF THE PROTOTYPED USER INTERFACE DESIGN: WIREFRAME



CHARACTERISTICS OF THE PROTOTYPED USER INTERFACE DESIGN: MOCKUP

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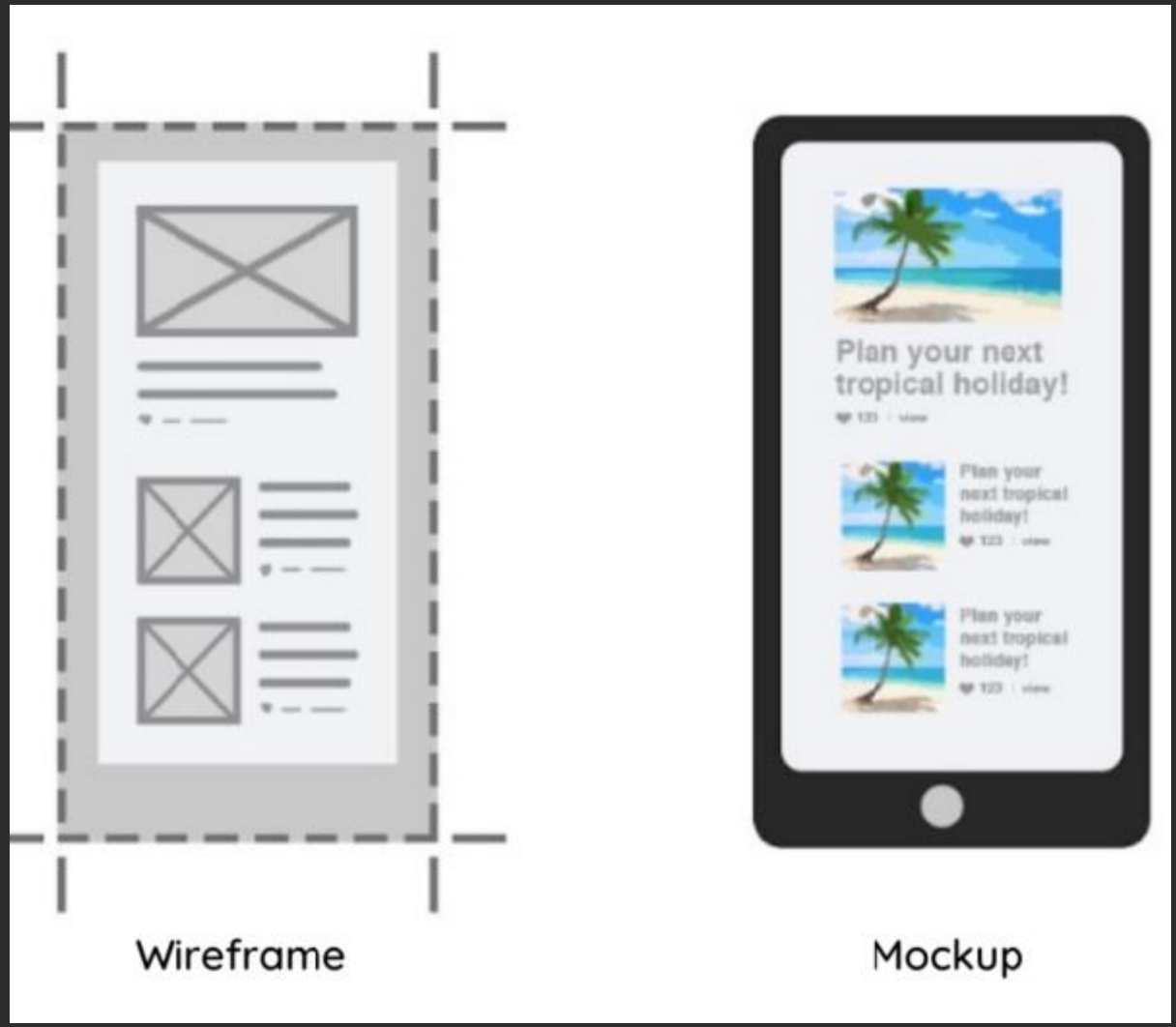
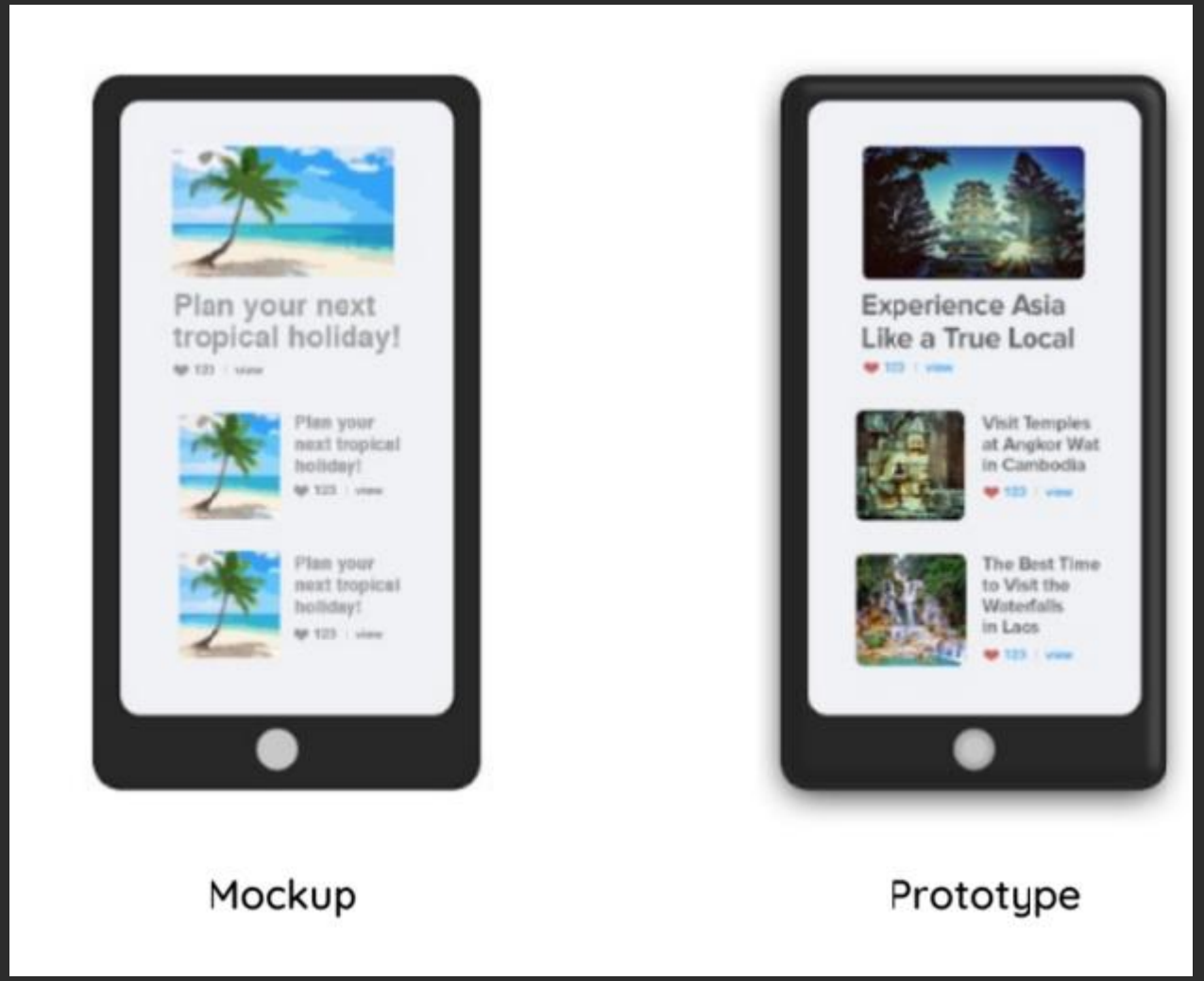
It remains a simple static representation but images, links and text are added. This allows for a clearer visualisation of the project.



CHARACTERISTICS OF THE PROTOTYPED USER INTERFACE DESIGN: PROTOTYPE

- A prototype is a mockup where interactions and animations have been added, representing the final version of a product before its design.



METHODS FOR DESIGNING A USER INTERFACE

Characteristics:

- **user-centred**
- **Prototyped**
  - **early evaluation**
- **progressive**

CHARACTERISTICS OF USER INTERFACE DESIGN: EARLY EVALUATION

Why?

- to verify the relevance of design choices as early as possible
- to allow for early adjustments

How to evaluate the prototype?

- according to a scenario (or several) based on a persona (fictitious user)
- based on a use case (way of using the application)
- set of tasks that the user must accomplish to achieve their goal

Outcome

- success/failure of the scenario
- quantitatively/qualitatively
  - number of errors, number of steps required, time spent
  - feedback, user satisfaction

USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION

- **Persona**
- **Use Case**
- **Scenario**

USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION - PERSONA

➢ **Persona:**

- "A persona is a user archetype, to which a name and face have been given, and which is described with care, in terms of needs, goals, and tasks" (Blomquist & Arvola)
- "Personas are fictional characters based on real data, which describe the target user populations." (John Pruitt & Jonathan Grudin)

persona is established based on:

Sociodemographic data: gender, age, occupation, ethnic origin, education level, place of residence, salary, family situation, etc.;

Psychographic data: personality, tastes, interests, beliefs, motivations, values, lifestyle, and consumption habits;

USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION - PERSONA

➢ **How to create a persona:**

- Step 1: Decide the purpose: Decide the purpose(s) of the use of personas.

- Step 2: Gather data: Conduct interviews, focus groups, surveys, and analyze existing data like customer support logs and web analytics to understand your target audience's mindsets, behaviors, and motivations

- Step 3: Analyze the data: Analyze the collected data to identify trends,

- Step 4: Identify archetype users: Look for trends, common behaviors, and shared characteristics in the research data you've collected.

- Step 5: Create persona profiles: Enhance personas with name, picture, topics of interest, quotes, etc.

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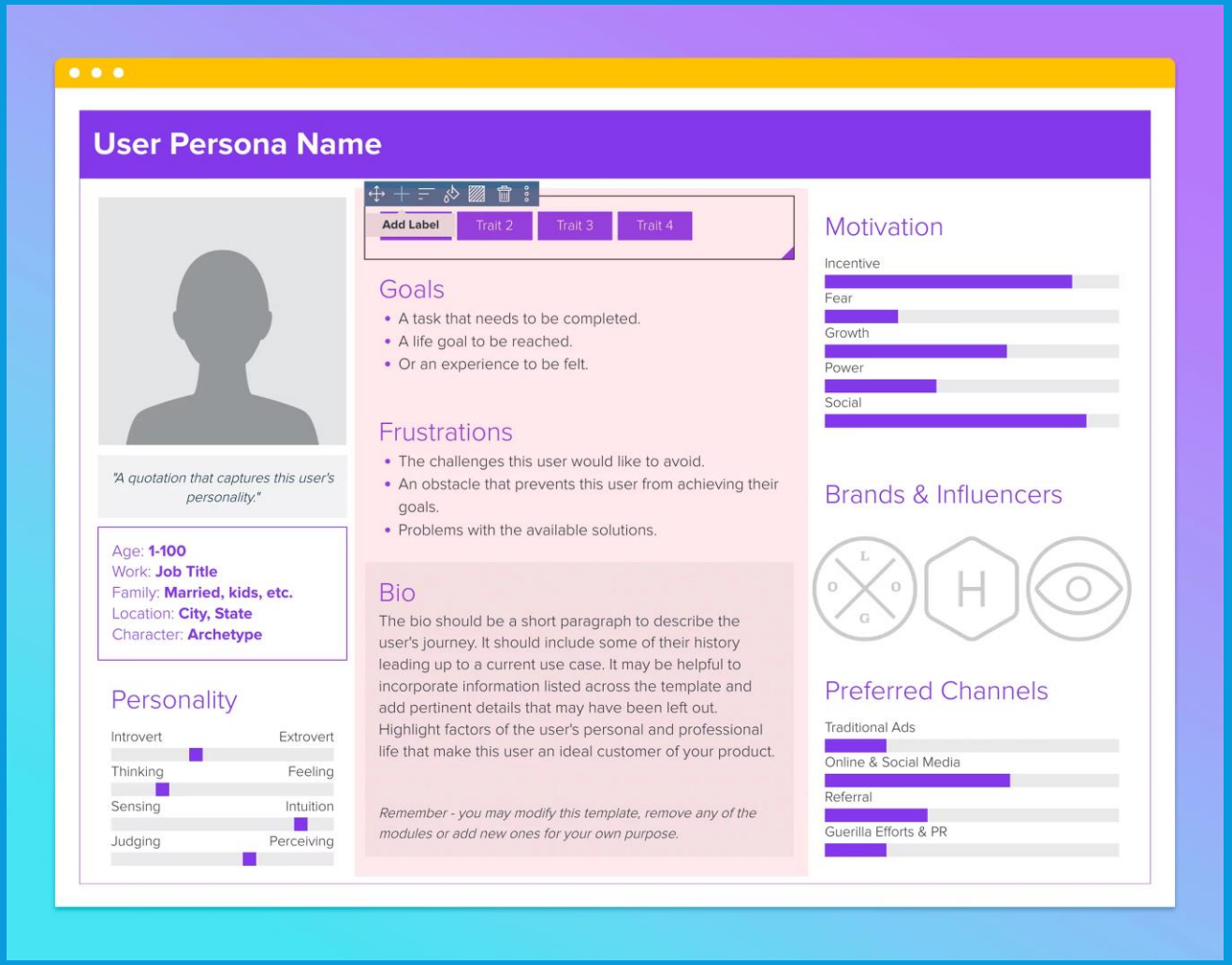
USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION - PERSONA

➢ Persona: Example



USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION - PERSONA

➢ Persona: Example

A persona always consists of personal information, such as:

- User type: age, gender, occupation, socio-professional category, etc.
- Their needs or motivation regarding the application.
- The criteria for choice.
- How they use the application.
- Domain expertise.
- Frustrations: provides insight into the problems encountered by the personas to suggest improvements,

USER INTERFACE DESIGN CHARACTERISTICS: EARLY EVALUATION - PERSONA

➢ Primary Persona and Secondary Persona:

- **Primary Persona: this is the inevitable target user for designing the interface.**
- **Secondary Persona: important users who share some needs with primary users but have additional needs.**

- **Example:**

for a GPS navigation system, two personas have been identified:
• Tourists to guide them to their destinations
• The professional delivery driver, who uses it for their work.
The primary persona here is the delivery driver because if the interface is tailored to their profile (daily use), it will also be usable by visitors (occasional use).

CHARACTERISTICS OF HCI DESIGN: EARLY EVALUATION - SCENARIO

- A scenario is a narrative text description of the path a specific user takes to accomplish one or more tasks.

- **The goal of the scenarios is to visualise the interactions with the system to meet the personas' needs,**
- **Example:**
- Ordering a Sandwich via the restaurant screen.
- **Response:**
  - Ridha checks the restaurant screen, he looks for the sandwich category,
  - the system displays the types of Sandwich he can buy,
  - Ridha selects his favourite sandwich,
  - the system shows other categories to accompany his meal,
  - Ridha chooses a drink and then confirms his order,
  - the system prints an order number to serve his dish.