

Unit 6: pytest and Test-Driven Development

1. Achieve an application development through using test-driven development.

Test-driven development (TDD) is a popular software development methodology that aims to improve code quality by writing tests before writing the actual code. The Pytest framework is a versatile tool for implementing TDD. The process involves following the "Red-Green-Refactor" cycle, which includes writing failing tests, writing the minimum code necessary to pass the tests, and then refactoring. The benefits of TDD include early detection of issues, improved code design, confidence in refactoring, and living documentation for code usage (Hawk, 2023).

Here is a Simple function that adds two numbers as an example based on the ideas of HyperTest (2023):

Red phase: Test for addition

```
def test_add():
    assert add(2, 3) == 5 #This test will initially fail
```

Green phase: Implement the *add* function

```
def add(x, y):
    return x + y

def test_add():
    assert add(2, 3) == 5
```

Refactor to improve the *add* function

```
def add(x, y):
    """Adds two numbers"""
    return x + y
def test_add():
    assert add(2, 3) == 5
```

However, TDD poses several challenges that need to be addressed. These challenges include cultural shifts in development teams, the learning curve and training, integration with existing codebases, balancing over-testing and under-testing, maintaining test suites, and dealing with complexity in test cases. Despite these challenges, the long-term benefits of adopting TDD, such as higher code quality, better design, and reduced bug rates, are often worth the initial investment (Hawk, 2023).

2. Appreciate the roles to be played when working within User Experience research.

According to Rosencrance (N.D.), UX research is a vital component of the design process, enabling designers to understand user needs and wants to enhance the design process for products, services, or software. It uses quantitative and qualitative methods like card sorting, contextual interviews, focus groups, expert reviews, surveys, usability testing, and A/B testing to validate concepts and prototypes and test brand designs and messaging before launching products.

The impact of UX research on user experiences is profound. It helps evaluate and improve ideas, discover new customer needs, find and fix flaws and provides the foundation for better user experiences. Understanding user interactions and target audiences helps develop more effective advertising and marketing strategies (Rosencrance, N.D.).

UX designers, product designers, visual designers, user/UX researchers, content strategists, and UX unicorns are critical in UX design. These roles work together on user research, prototyping, and usability testing tasks to ensure a user-centred design, product roadmap, and visually appealing interface (The Interaction Design Foundation, N.D.).

UX researchers, also known as Usability Researchers, User Researchers, and Researchers, are the backbone of the design process. They use qualitative and quantitative user research methods to provide actual user information, which is crucial for other designers to inform their designs. Their role is pivotal, as they empathise with users to understand their needs and help define problems for the product (Siang, 2024).

UX researcher tasks include gathering a rich understanding of users through qualitative methods like interviews and observations, analysing data to synthesise critical findings, advocating for users' needs and perspectives, helping inform product goals, and testing and improving designs through evaluative research (Siang, 2024).

Main UX deliverables include user research reports, user personas, user stories, user journey maps, "How might we" statements, usability/user testing reports, and heuristic evaluation reports. A UX researcher should have a strong passion for human psychology, a deep understanding of psychology, and a love for generating and analysing complex data to deliver the best possible user experience (Siang, 2024).

3. Contextualise a reaction to a software development project on the basis of the emotions of the stakeholders.

Software engineering relies heavily on humans' intellectual and social activities, making the human aspect a crucial element. In SE, individuals, teams, management, and stakeholders, including customers and clients, play essential roles. Effective communication and collaboration between users, analysts, and customer participation are critical for requirements analysis, a multidisciplinary process that can benefit from tools, techniques, and human expertise. Emotions are significant in developing and producing requirements, and understanding stakeholders' emotional perspectives is essential (Colomo-Palacios et al. N.D.).

Effective stakeholder management is essential for a project's success. This involves identifying, prioritising, assessing, defining, and developing a comprehensive engagement plan tailored to each stakeholder's needs. The process enables the management of expectations and performance improvement. It involves defining motives, conducting interviews, surveys, and focus groups, and executing the engagement plan with precision and attention to detail. A robust stakeholder management strategy is critical in fostering positive relationships, securing buy-in, and achieving project success (Trovato, 2022).

Software development managers (SDMs) are not just facing pressure; they are facing a new reality. The complexity of risk and stakeholder issues in the development process often requires trade-offs between time, cost, and quality. However, many organisations are not just lacking; they desperately need the necessary infrastructure, education, training, or management discipline. Human factor management, including leadership, stakeholder, and risk management, is not just essential; it is the key to developing successful information systems. Emerging trends are not just suggesting that technical skills will have less currency than leadership, stakeholder management, and governance (BCS, N.D.).

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