

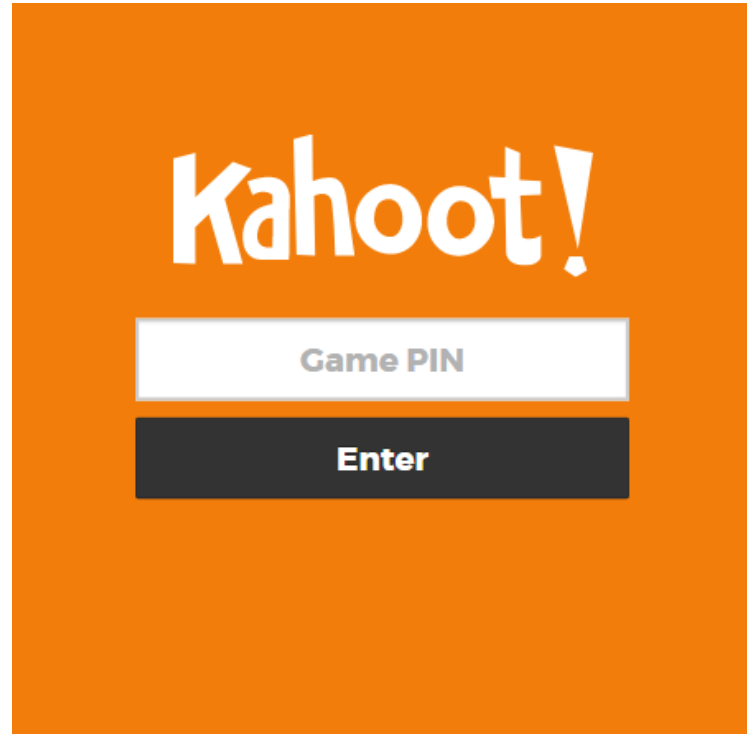
# TESTING SOFTWARE QUALITY CHARACTERISTICS

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TAPOST 2017

# Agenda

- Introduction
- Quality
- Functionality
- Usability
- Accessibility



- <https://kahoot.it>
- Kahoot app

- What is Quality?
  - The standard of something as measured against other things of a similar kind; the degree of excellence of something (from dictionary)
- Quality characteristics are defined in standards:
  - ISO 9126
  - ISO 25000

# Quality Characteristics (ISO 9126)

## Functionality

- Accuracy
- Suitability
- Interoperability
- Security

## Reliability

- Maturity (robustness)
- Fault-tolerance
- Recoverability

## Usability

- Understandability
- Learnability
- Operability
- Attractiveness

## Functionality

The capability of the software product to provide functions which meet stated and implied needs when the software is used under specified conditions.

Ref: ISO 9126

# Quality Characteristics (ISO 9126)

## Functionality

- Accuracy
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## Reliability

The ability of the software product to perform its required functions under stated conditions for a specified period of time, or for a specified number of operations.

Ref: ISO 9126

# Quality Characteristics (ISO 9126)

## Functionality

- Accuracy
- Suitability
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## Reliability

- Maturity (robustness)
- Fault-tolerance
- Recoverability

## Usability

- Understandability
- Learnability
- Operability
- Attractiveness

## Usability

The capability of the software to be understood, learned, used and attractive to the user when used under specified conditions.

Ref: ISO 9126

# Quality Characteristics (ISO 9126)

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## Usability

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- Learnability
- Operability
- Attractiveness

## Efficiency

- Performance (time behavior)
- Resource utilization

## Maintainability

- Analyzability
- Changeability
- Stability
- Testability

## Portability

- Adaptability
- Installability
- Co-existence
- Replaceability

# Quality Characteristics (ISO 9126)

## Efficiency

(1) The capability of the software product to provide appropriate performance, relative to the amount of resources used, under stated conditions.

(2) The capability of a process to produce the intended outcome, relative to the amount of resources used.

Ref: ISO 9126

## Efficiency

- Performance (time behavior)
- Resource utilization

## Maintainability

- Analyzability
- Changeability
- Stability
- Testability

## Portability

- Adaptability
- Installability
- Co-existence
- Replaceability



# Quality Characteristics (ISO 9126)

## Maintainability

The ease with which a software product can be modified to correct defects, modified to meet new requirements, modified to make future maintenance easier, or adapted to a changed environment.

Ref: ISO 9126

## Efficiency

- Performance (time behavior)
- Resource utilization

## Maintainability

- Analyzability
- Changeability
- Stability
- Testability

## Portability

- Adaptability
- Installability
- Co-existence
- Replaceability

# Quality Characteristics (ISO 9126)

## **Portability**

The ease with which the software product can be transferred from one hardware or software environment to another.

Ref: ISO 9126

## **Efficiency**

- Performance (time behavior)
- Resource utilization

## **Maintainability**

- Analyzability
- Changeability
- Stability
- Testability

## **Portability**

- Adaptability
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# Quality Characteristics (ISO 9126)

## Functionality

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## Efficiency

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- Changeability
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## Portability

- Adaptability
- Installability
- Co-existence
- Replaceability

# Functionality

- Accuracy
- Suitability
- Interoperability
  
- Security

# Accuracy

The capability of the software product to provide the right or agreed results or effects with the needed degree of precision



- Does the system give the right answer and produce the right effects?
- Refers to the right degree of precision in the results
- Critical for applications that is used for math, statistics, accounting, science, engineering etc.
- Important on all test levels
- Requires reliable and precise test oracle

# Accuracy

●●●○ Tele2 4G 11:49 76%

< Order Details


Delivery Information >

Contact Seller >

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Seller: Gleco Official Store >

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 LED STRIP Kit DC12V LED Strip  
5050 60LED/m 5M with 2.4G...  
RGBWW+IP20 No waterproof  
**EUR €17,13x1**

[Open Dispute](#)

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Order Summary (1 item)

Subtotal:	EUR €17,12
Shipping:	EUR €0,00
AliExpress Select Coupon	-EUR €1,71
All Total:	<b>EUR €15,42</b>

# Suitability

The capability of the software product to provide an appropriate set of functions for specified tasks and user objectives



- Given the problem we need to solve, can the system solve it?
- Focused on the appropriateness of set of functions, relative to its intended, specific tasks
- Are we building the system right?
- Starts early during integration tests, continues through system to acceptance tests
- If the user's needs are not met, regardless of whether requirements are fulfilled, then the software is not suitable
- We can employ use cases, test scenarios and exploratory testing
- Traceability to requirements

# Interoperability

The capability of the software product to interact with one or more specified components or systems

- Ability of systems or components to exchange information and use that information in all intended environments
- Good interoperability allows integration to other systems with ease
- Design considerations:
  - Industry-wide communication standards (XML)
  - Ability to provide standard, flexible and robust interfaces
  - Ability to automatically detect and adapt to interfaces, protocols etc.
- Component integration, system and system integration testing



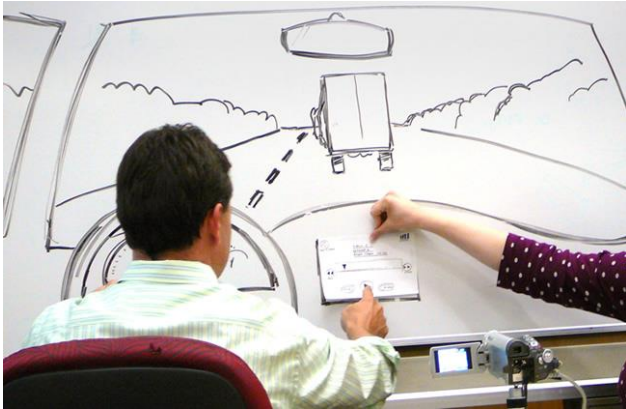


# Usability

- Understandability
- Learnability
- Operability
- Attractiveness

# Usability

Testing to determine the extent to which the software product is understood, easy to learn, easy to operate, and attractive to the users under specified conditions



- Focuses on users
- Usability test experts have background
  - psychology,
  - sociology,
  - ergonomics
- Take into account user skills, abilities and disabilities
- It is suitable for users – they can achieve their goals accurately and completely under expected conditions
- Use actual users under their usage conditions

# Usability

## Understandability

- attributes of the software that affect the effort required by the user to recognize the logical concept and its applicability

## Learnability

- attributes of software that affect the effort required by the user to learn the application

## Operability

- attributes of the software that affect the effort required by the user to conduct tasks effectively and efficiently

## Attractiveness

- the capability of the software to be liked by the user

# Usability testing

## Formative

- testing that is conducted iteratively during the design and prototyping stages to help guide (or "form") the design by identifying usability design defects

## Summative

- testing that is conducted after implementation to measure the usability and identify problems with a completed component or system

# Usability Test Specification

Inspection,  
evaluation or  
review

Dynamically  
interacting with  
prototypes

Validation of  
actual product

Surveys and  
questionnaires

- SUMI
- WAMMI

# Measuring usability testing

## Effectiveness

- capability of the software product to enable users to achieve specified goals with accuracy and completeness in a specified context of use

## Efficiency

- capability of the product to enable users to expend appropriate amounts of resources in relation to the effectiveness achieved in a specified context of use

## Satisfaction

- capability of the software product to satisfy users in a specified context of use

# Accessibility

Testing to determine the ease by which users with disabilities can use a component or system



- Special form on Usability tests
- Focused on people with particular needs or restrictions
- Accessibility has to be designed into the system
- Should consider relevant standards
- Component integration testing, System testing, Acceptance testing

# Why to test Quality Characteristics?

- Increase user satisfaction and usability of product
- Increase quality
- Reduce risks
- Find defects
- Provide confidence

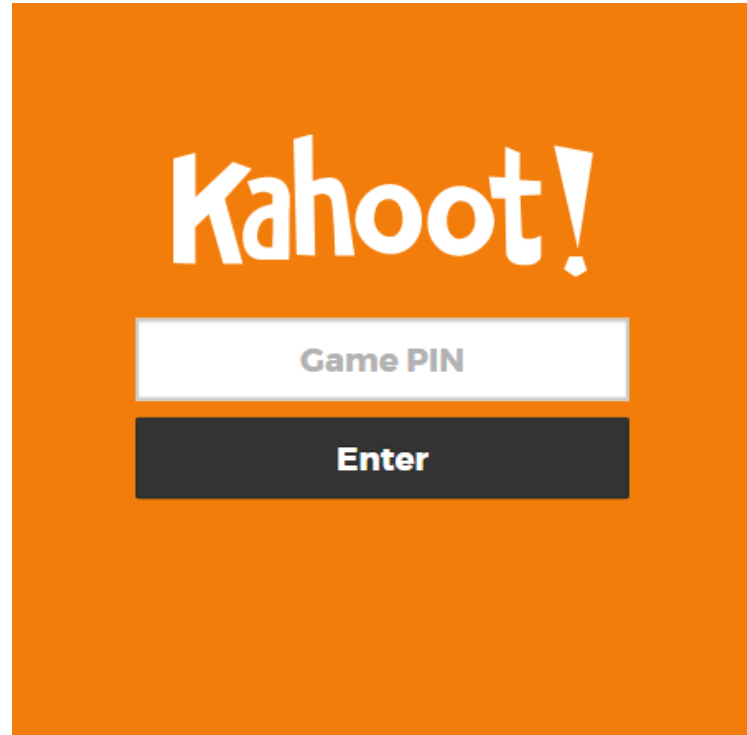


# Takeaway

- Expand the usual test levels with testing Quality Characteristics
- Include Quality characteristics in your plan – even if you do not plan to test them
- When planning testing, think of
  - How?
  - What is required?
  - What will be achieved?

# Quiz

- <https://kahoot.it>
- Kahoot app





The winners of the quiz are?

# References

- ISTQB - Advanced Level Syllabus - Test Analyst

# Questions?

More information about ISTQB authorized training and certification –  
see [www.bda.lv](http://www.bda.lv)  
Or e-mail [bda@bda.lv](mailto:bda@bda.lv)  
Or call +371 67505090