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Logica

Testing a Virtual Juggling Program

by ir. Han Toan Lim

Introduction

- Han Toan Lim
  - Professional juggler ;)
  - Workshop leader on international and national juggling conventions
  - Treasurer of Dutch SIGIST TestNet
  - Board member of Belgium and Netherlands Testing Qualifications Board (ISTQB)
  - World record holder juggling (Guinness Book of Records)

Agenda

- Introduction
- **System Under Test**
- Product risks
- Like for like
- Performance
- Ethics
- Psychology
- Juridical aspects
- Conclusions

System under test (1)

- What is virtual reality?
  - Virtual reality (VR) is a technology which allows a user to interact with a computer-simulated environment, be it a real or imagined one. (Wikipedia)
  - It means, that the user can move objects in an imaginary world.
  - There is interaction between the user and the computer.
- Examples
  - Wii
  - Flight training simulator
  - Race simulator

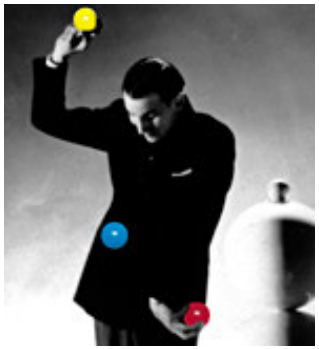
www.nintendo.nl; www.microsoft.com ; www.stsoftware.nl

System under test (2)

- What do you need for a virtual juggling program?
  - Virtual glasses
  - Data gloves
  - Software

www.motion-capture-system.com

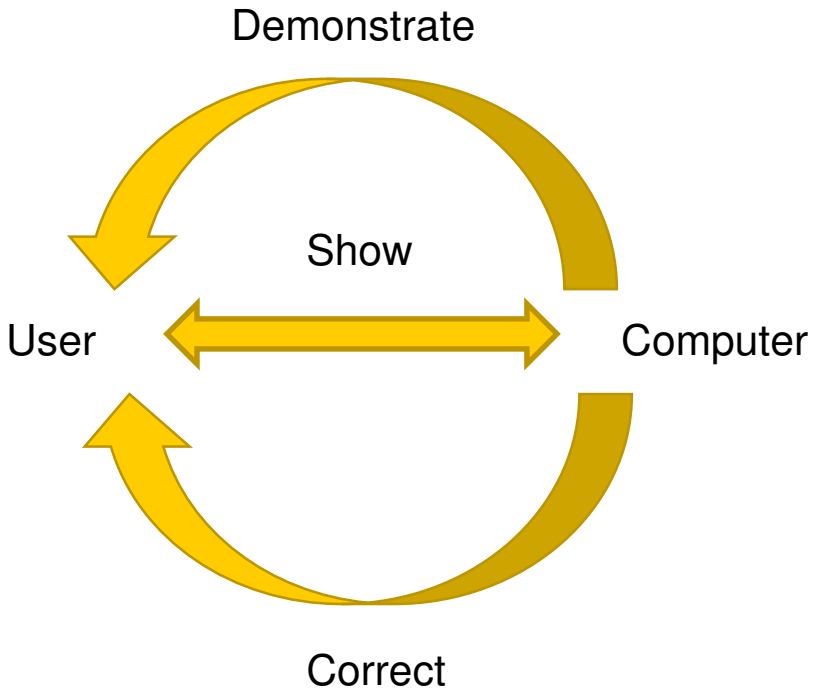
- What is the goal of the program?
  - Teach juggling
  - Give tips to become a world champion in juggling



www.dube.com

System under test (3)

- Simplified value stream mapping



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Product risks (1)

- RRBT (Risk and Requirement Based Testing)

- Like for like
  - The difference between the virtual world and the real world is too big.
  - If the user throws a ball, will it fall down?
- Performance
  - The program is too slow.
  - How long must the user wait?
- Ethics
  - The program has overstepped the boundaries.
  - What does the user feel, if he gets hit by a club?

www.nintendo.nl
www.dube.com

Product risks (2)

- Psychology
  - The virtual program does not adjust to the user.
  - Does it teach the user a simple juggling trick?
- Juridical aspects
  - A user will start a law suit because of injuries or damage.
  - Is the user fully aware, that he might injure himself using clubs in reality?

www.nintendo.nl
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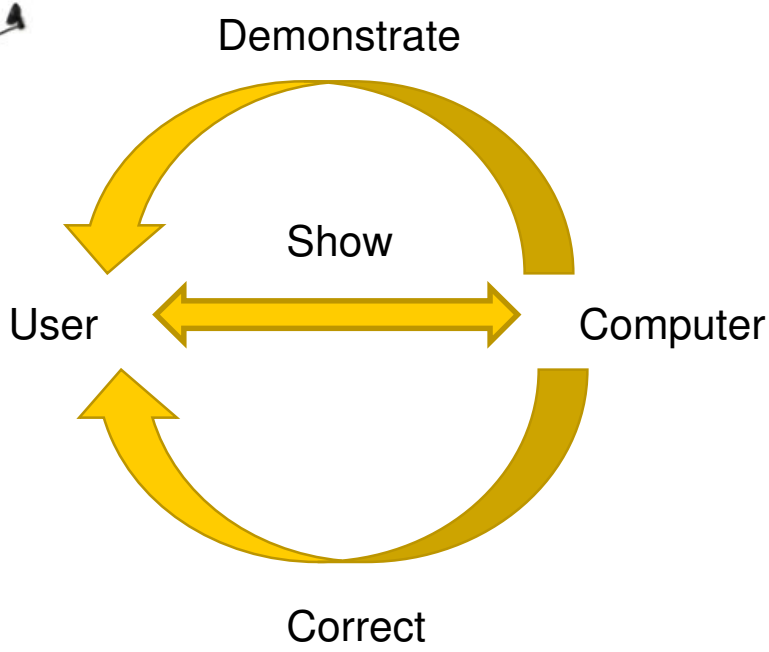
Like for like (1)

- Trivial test techniques for sight:
  - Gravity (Physics test)
  - Ball type (Physics test)
  - Roll away (Physics test)
  - Spotlight (Biology test)
- Other test techniques to consider:
  - Prop on ground (Biology test)
  - Frequency frames (Biology test)

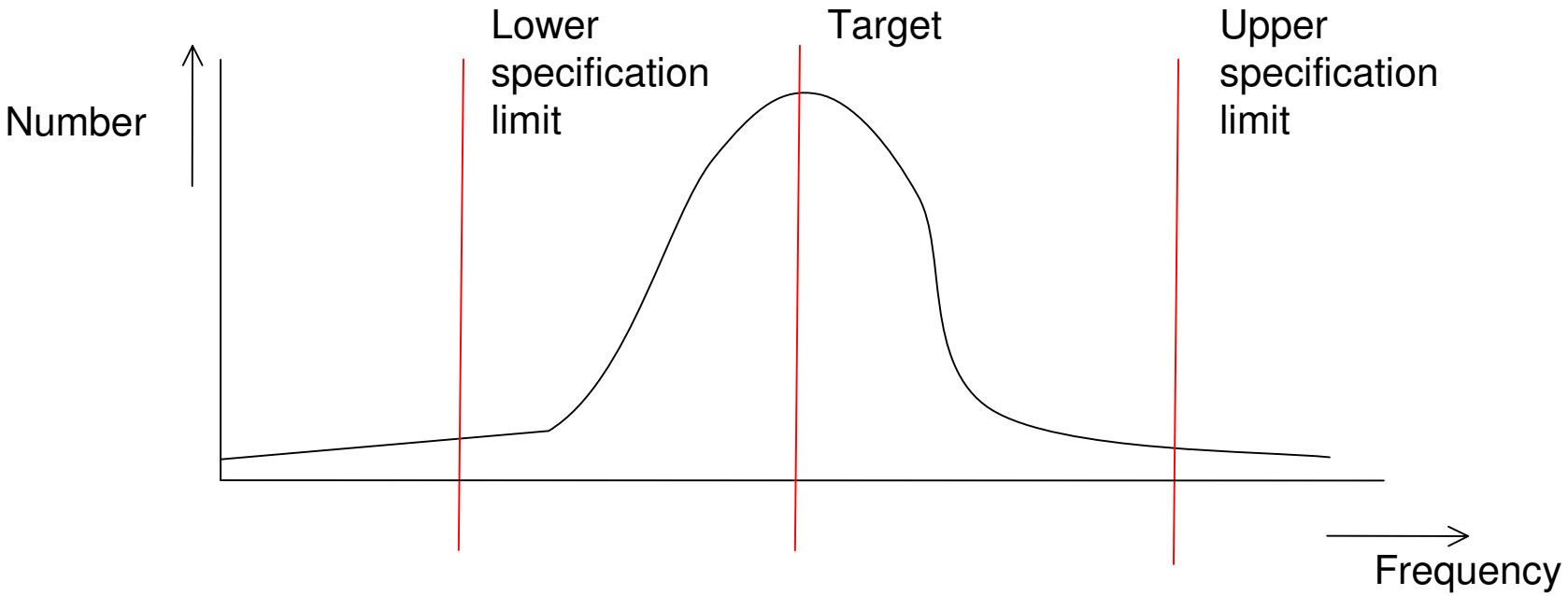
Simplified value stream mapping



www.haptica.com

Like for like (2)

- Critical information: information, which is needed for a proper execution of the application.



Like for like (3)

- Storage of critical information
  - Frequency
  - Notation / juggling term
- Why not test on storage?

- Are there enough sensors?
- Why not test on sensor coverage?

www.motion-capture-system.com

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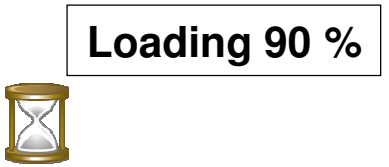
Performance (1)

- Critical information: information, which is needed for a proper execution of the application.
- Speed of information handling
  - How fast is the information stored?
  - How fast is the information analysed?
  - How fast is the information restored?
- Why not test on performance?



Performance (2)

- The 7 wastes (Shigeo Shingo) are:

  1. Defects (e.g. testing)
  2. Overproduction (e.g. frames)
  3. Transportation
  4. Waiting (e.g. time to analyze information)
  5. Inventory (e.g. disk space)
  6. Motion
  7. Processing (e.g. calculations)

- Why not test on waste?

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Ethics

- What does the user feel, if
  - He catches a ball
  - He catches a burning torch in the wrong way

•Overconfidence might lead to accidents.

  - He over-enjoys juggling?

•Addiction might lead to neglection of important things like business and family.

- Why not test on ethics?

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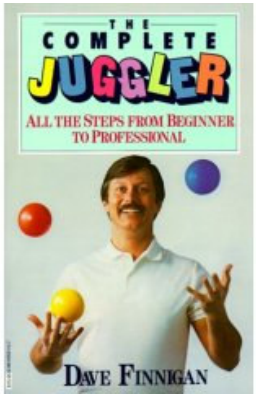
Psychology (1)

- Teacher
  - Learning style (Kolb's Learning Styles)
  - Teaching style
  - Camera
  - Voice
  - Why not test on psychology test?



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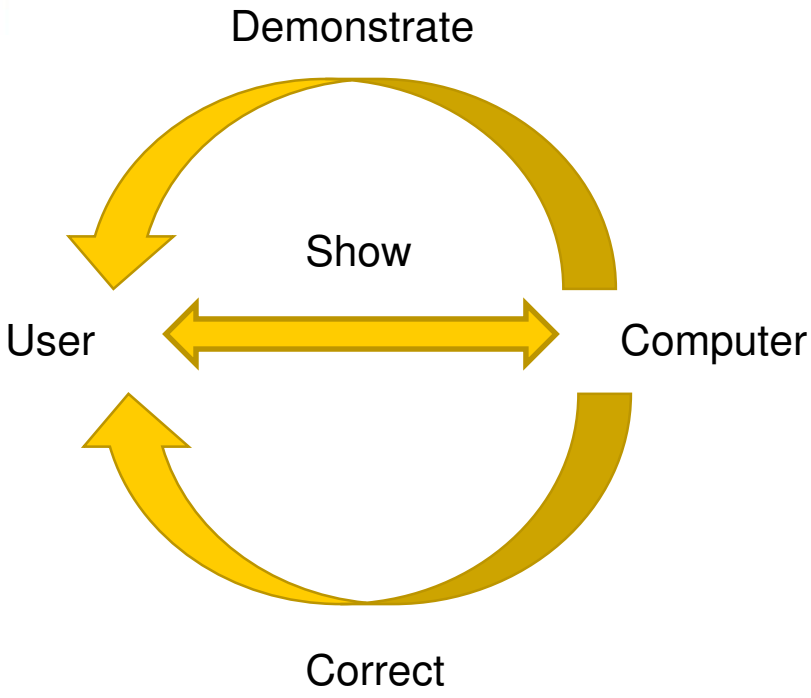

Psychology (2)

- Why does a user want to juggle?
  - Casual juggler – need for acceptance; need to see or be seen
  - Social juggler – need for communion
  - Professional juggler – need for food, water and shelter
  - World record holder – need for challenge
  - World champion – need for respect

www.dube.com

- A list of needs can be found on the web site of the Center for Nonviolent Communication (www.cnvc.org)
- Why not test on psychology?

www.racingsimulators.com

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Juridical aspects

- Real world (interaction test)

- Purpose legal disclaimer:
  - Prevention of injury and damage
  - Expectation
- When is the user warned?
  - Installation
  - Licence
  - Manual
  - During usage
- Why not test on juridical aspects?

Example of bad disclaimer

1. Watch out for seizures
2. This program is a tool to help you become world champion in juggling. This is not a guarantee.
3. Juggle at least 1.5 metres from the wall, furniture and people.
4. Remove all objects in view that might break.
5. Secure the juggling zone.

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Conclusions (1)

- Use fundamentally different testing techniques and approach
  - Product risks are determined in the same way, but other test techniques are used
  - Physics test (How will the ball fall and roll away?)
  - Biology test (When is the user blinded by a spotlight?)
  - Interaction test (How will the program react, if you move forwards?)
  - Waste test (How is waste reduced?)
  - Storage test (How is information stored and restored?)
  - Sensor Coverage test (Are enough sensors of the right type being employed?)

- Specify and verify the critical information
  - **What are the critical few parameters? (Which information should be stored?)**

  - Performance test (How fast is information stored and restored?)

Conclusions (2)

- Pay attention to psychology and ethics
  - Ethical test (Is it right, that the user gets hurt, if he catches a burning torch? Is it right, that a user get addicted to juggling?)
  - Psychology test (Does the program adapt to the learning style of the user? Does the program determine the need of the user? How does the program handle the expectations of the user?)
  - Juridical Aspects test (Is the user warned in time for juggling dangerous objects?)

- Use domain knowledge intensively for virtual testing.
  - Involve someone with domain knowledge in the test.
  - Involve someone with domain experience in the test.

Contact address: han.toan.lim@logica.com