Software Testing Foundation

For External Courses

2022

Agenda

Why do we need Testing

History

Quality Management & Quality Assurance & Quality Control

Testing definition

Typical Testing Objectives

Testing Principles

Psychology of Testing

Testing in everyday life

What do we mean by the word "testing"? We use the words test and testing in everyday life and earlier we said testing could be described as checking the software is OK

Driving test

The examiner takes the driver through a route which tests many possible driving activities, such as road junctions of different types, control and maneuvering of the car, ability to stop safely in an emergency, and awareness of the road, other road users and hazards.

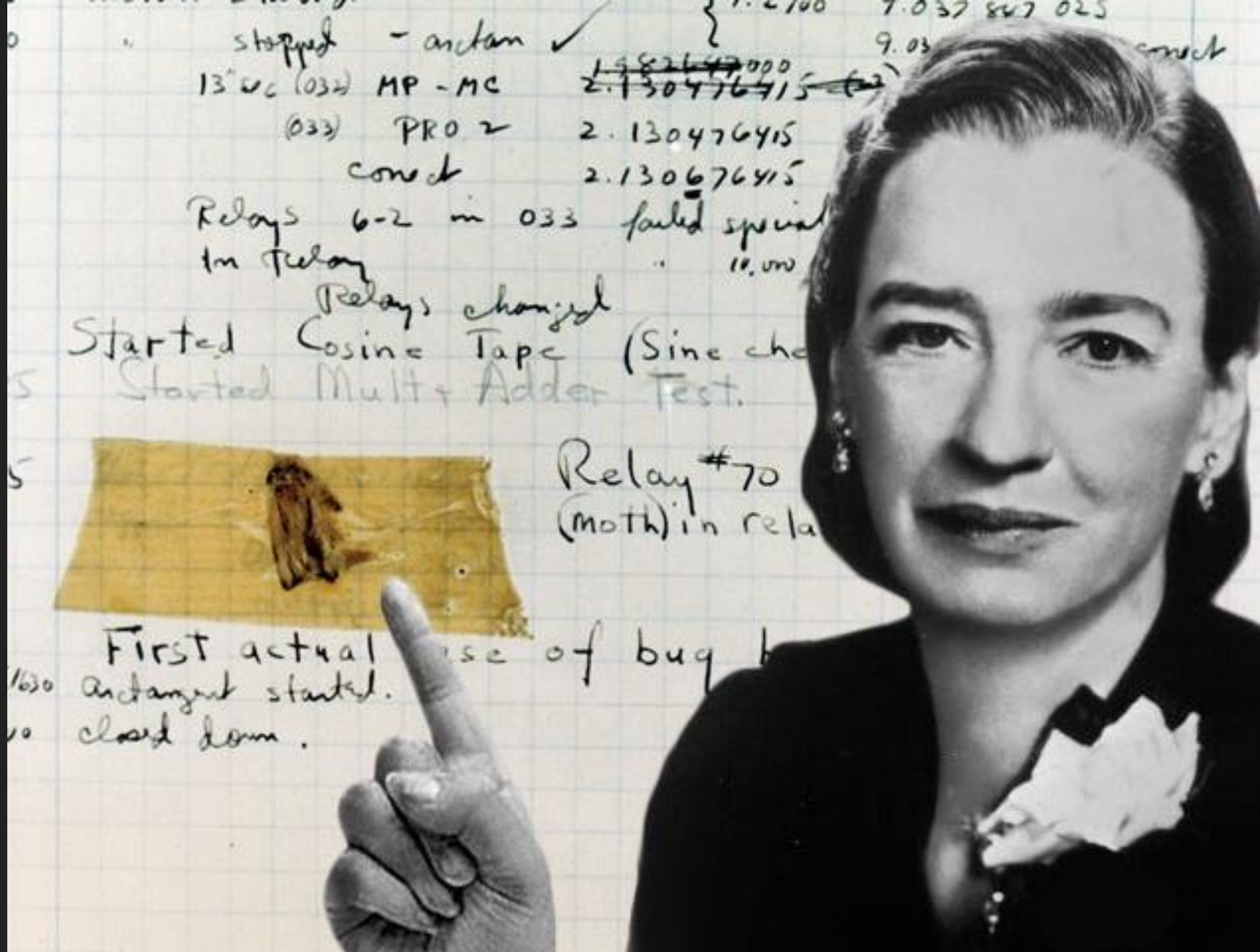
- The test is planned and prepared for
- The test has known goals
- The test is therefore carried out to show that the driver satisfies the require ments for driving and to demonstrate that they are fit to drive.

Why do we need Testing?

Testing is necessary because we all make mistakes. Some of those mistakes are unimportant, but some of them are expensive or dangerous. We need to check everything and anything we produce because things can always go wrong - humans make mistakes all the time - it is what we do best!

Mark II Aiken Relay Calculator

History


stopped - arctan
13" u/c (032) MP - MC
(033) PRO 2
correct
Relays 6-2 in 033 failed special
Relays changed
Started Cosine Tape (Sine
Started Multy Adder Test.
Relay #70
(moth) in rela
First actual
of bug
arctangent started.
closed down.

History

Throughout the history of computing, it is quite common for software and systems to be delivered into operation and, due to the presence of defects, to subsequently cause failures or otherwise not meet the stakeholders' needs

50 - x Debugging

60 - x Exhaustive testing

70 - x Positive and Negative testing

80 - x Software lifecycle

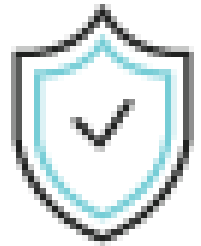
90 - x Quality Assurance

2000 Quality definition Automation testing

Testing’s Contributions to Success

Throughout the history of computing, it is quite common for software and systems to be delivered into operation and, due to the presence of defects, to subsequently cause failures or otherwise not meet the stakeholders’ needs

Quality - the degree to which a component or system satisfies the stated and implied needs of its various stakeholders.

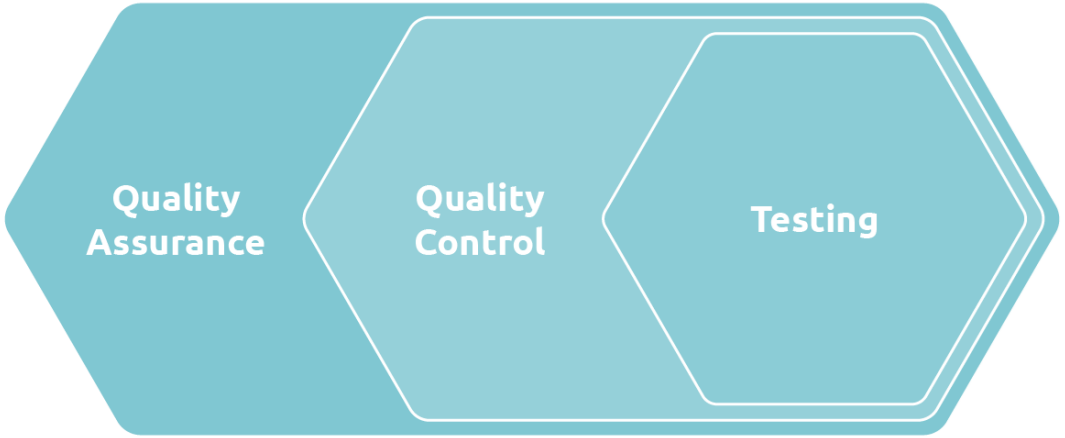


QA, QC and Testing

Quality Control - a set of activities designed to evaluate the quality of a component or system

Quality Assurance - activities focused on providing confidence that quality requirements will be fulfilled

Quality Management - The process of establishing and directing a quality policy, quality objectives, quality planning, quality control, quality assurance, and quality improvement for an organization



Testing definition

- Process
- All life cycle activities
- Both static and dynamic
- Planning
- Preparation
- Evaluation
- Software products and related work products
- Determine that (software products) satisfy specified requirements
- Demonstrate that (software products) are fit for purpose
- Detect defects

Testing

The process consisting of all lifecycle activities, both static and dynamic, concerned with planning, preparation and evaluation of a component or system and related work products to determine that they satisfy specified requirements, to demonstrate that they are fit for purpose and to detect defects.

Driving test

- Both static and dynamic
- Planning
- Preparation
- Evaluation
- Determine that satisfy specified requirements
- Demonstrate that are fit for purpose
- Detect defects

Typical Objectives of Testing

To prevent defects by evaluate work products such as requirements, user stories, design, and code

To verify whether all specified requirements have been fulfilled

To check whether the test object is complete and validate if it works as the users and other stakeholders expect

To build confidence in the level of quality of the test object

To find defects and failures thus reduce the level of risk of inadequate software quality

To provide sufficient information to stakeholders to allow them to make informed decisions, especially regarding the level of quality of the test object

To comply with contractual, legal, or regulatory requirements or standards, and/or to verify the test object's compliance with such requirements or standards

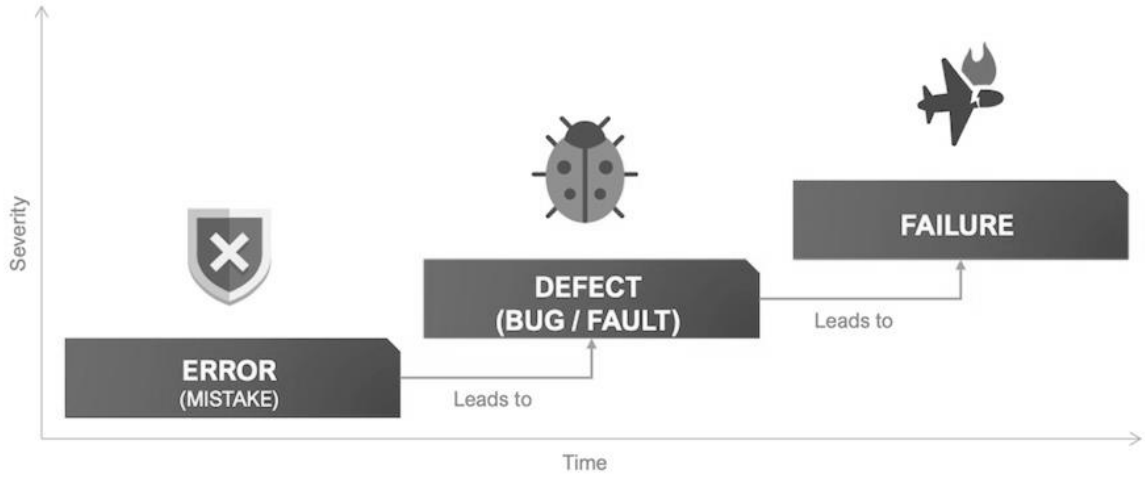
Error >> Defect >> Failure

Why is it that software systems sometimes don't work correctly? We know that people make mistakes - we are fallible

Error - a human action that produces an incorrect result

Defect - an imperfection or deficiency in a work product where it does not meet its requirements or specifications

Failure - an event in which a component or system does not perform a required function within specified limits.



Our fallibility is compounded when we:

- lack experience
- don't have the right information
- misunderstand
- we are careless
- tired
- under time pressure

Root Causes

The root causes of defects are the earliest actions or conditions that contributed to creating the defects

Root Causes - a source of a defect such that if it is removed, the occurrence of the defect type is decreased or removed.

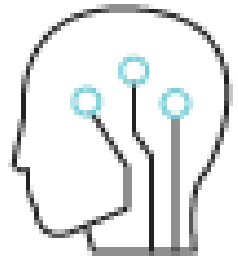
Testing Principle

A number of testing principles have been suggested over the past 50 years and offer general guidelines common for all testing.

Testing Principle

Testing shows the presence of defects, not their absence	Testing can show that defects are present, but cannot prove that there are no defects.
Exhaustive testing is impossible	Testing everything (all combinations of inputs and preconditions) is not feasible except for trivial cases. Rather than attempting to test exhaustively, risk analysis, test techniques, and priorities should be used to focus test efforts.
Early testing saves time and money	To find defects early, both static and dynamic test activities should be started as early as possible in the software development lifecycle.
Defects cluster together	A small number of modules usually contains most of the defects discovered during pre-release testing, or is responsible for most of the operational failures
Beware of the pesticide paradox	If the same tests are repeated over and over again, eventually these tests no longer find any new defects.
Testing is context dependent	Testing is done differently in different contexts.
Absence-of-errors is a fallacy	It is a fallacy to expect that just finding and fixing a large number of defects will ensure the success of a system

The Psychology of Testing



Software development, including software testing, involves human beings. Therefore, human psychology has important effects on software testing.

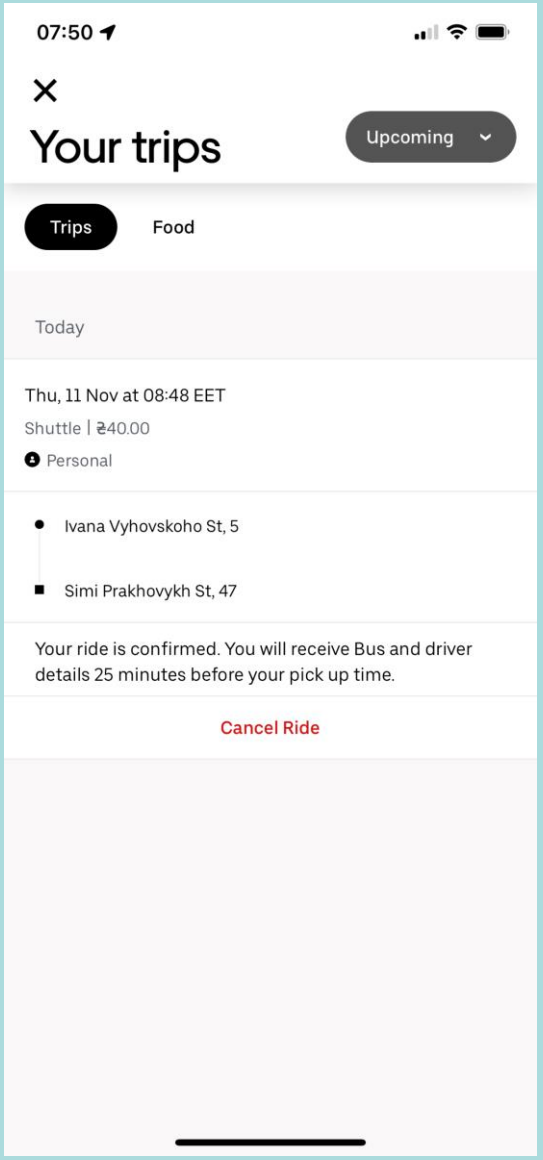
Many of us find it challenging to actually enjoy criticism of our work. We usually believe that we have done our best to produce work (documents, code, tests, whatever) which is correct and complete.

Start with collaboration rather than battles

Confirm that the other person has understood what has been said and vice versa.

Try to understand how the other person feels and the reasons they may react negatively to the information.

Communicate test results and other findings in a neutral, fact-focused way without criticizing the person who created the defective item.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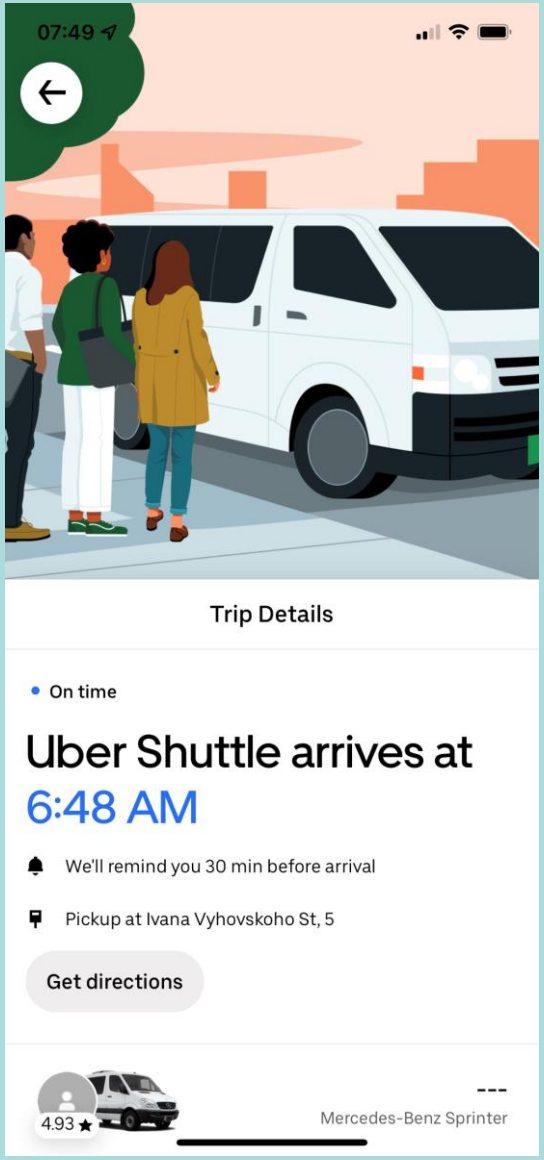
Your trips
Upcoming
Trips
Food
Today
Thu, 11 Nov at 08:48 EET
Shuttle | ₴40.00
Personal
Ivana Vyhovskoho St, 5
Simi Prakhovykh St, 47
Your ride is confirmed. You will receive Bus and driver details 25 minutes before your pick up time.
Cancel Ride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Trip Details
On time
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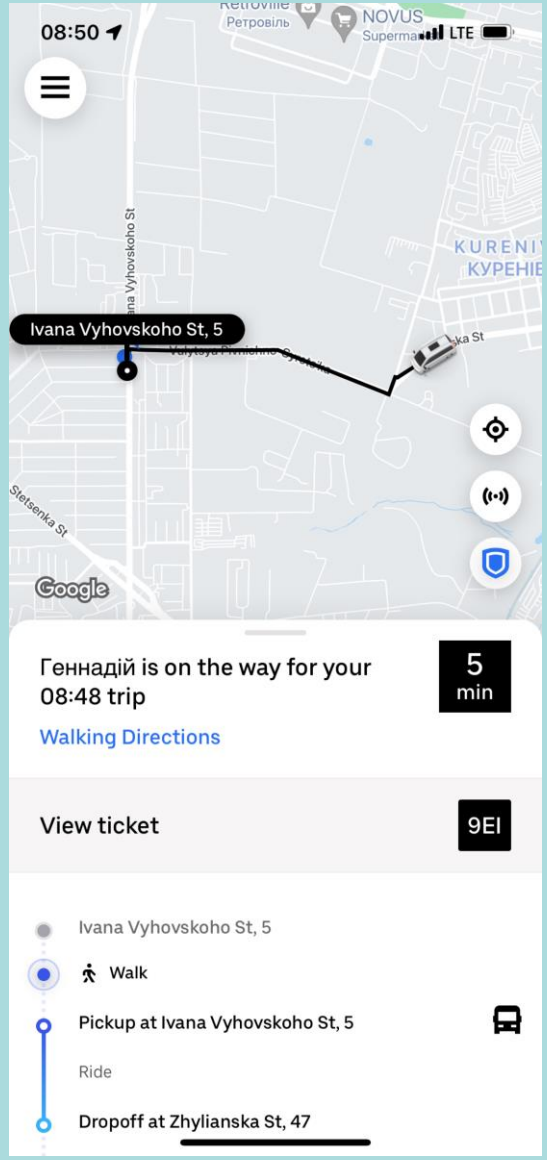
We'll remind you 30 min before arrival
Pickup at Ivana Vyhovskoho St, 5
Get directions
4.93

Mercedes-Benz Sprinter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NOVUS
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Ivana Vyhovskoho St, 5
Google
Геннадій is on the way for your 08:48 trip
5 min
Walking Directions
View ticket
9EI
Ivana Vyhovskoho St, 5
Walk
Pickup at Ivana Vyhovskoho St, 5
Ride
Dropoff at Zhylianska St, 47

Home Task

to read:

1. This presentation
2. Syllabus 12 – 27 pp
3. Software Testing (Куліков) 4 – 18 pp

to learn:

1. Vocabulary

to do:

1. Quiz

Questions

Thank you