

# Introduction to testing

<https://github.com/makersacademy/intro-to-testing>

Manual testing Course - youtube

Lots of duplication from this course

## Phase one - quality and risks

Quality - within software

*The quality of a system is the degree to which the system satisfies the stated and implied needs of its various stakeholders, and thus provides value.*

## SDLC

- Planning
- Designing
- Developing
- Testing
- Deploying

## Black and white box testing

### White

When tests are written with knowledge of the code, such as class and method implementation, this is called "white box testing" because there's full visibility of how it works.

### Black

On the other side we have the term black box - in this situation, there is no knowledge of the planned implementation nor actual implementation, through any means.

## Risks

Simply put, a risk is something that may or may not occur which could cause some sort of problem or loss. In the world of software development and quality engineering, risks (as a concept) come up a lot when we making decisions about things from how to design a program, what we should test first, through to whether we're in a position to release a product.

## Risk assessment

The two factors above - likelihood and severity - should be considered separately, as an overall risk assessment needs to take both parts into account. You may see grids like the following one, where the two different factors for a single risk are combined or multiplied together to give an overall risk assessment:

High Impact / Low Likelihood	High Impact / High Likelihood
Low Impact / Low Likelihood	Low Impact / High Likelihood

### likelihood

It's common to see an evaluation of likelihood given on either a numerical scale (e.g. 5 is very likely and 1 is unlikely) or a High/Medium/Low rating.

### severity

It's common to see an evaluation of severity given on either a numerical scale (e.g. 5 is very negatively impactful and 1 is minor) or a High/Medium/Low rating.

## Roles, responsibilities and quality

### Introduction to testing day 1 exercise

#### Exercise - quality

[https://github.com/makersacademy/intro-to-testing/blob/main/phase1/03\\_group\\_quality.md](https://github.com/makersacademy/intro-to-testing/blob/main/phase1/03_group_quality.md)

- 1\* Developer (the person writing the code)
  - Ibrahim
- 1\* Product Manager/Owner (the person who knows what the customer wants)
  - Joao
- N\* Testers, for however many other people are in your group
  - Adam

## Planning i.e. at the very start

- What are your responsibilities?
  - What are your main concerns? What matters most to you at this stage?
  - What can you do to help improve the quality of the program?
  - What other things can you effect - are there processes, tools, lines of communication, etc. where the quality of those can be improved? Could those improvements indirectly improve the quality of the program?
- 

### Ibrahim

I-

- after receiving basic model/plan from owner
  - how realistic the time scales are
  - how many staff (relative to the time)
  - costs
  - consider tools/languages and methods
  - consider platforms that 'the product' will be used on
  - feedback to the owner to provide them the info from the dev's expertise to allow the owner to make an informed decision
- I -
  - depending on the technology that has been agreed on - having the appropriate talent
  - realism in all areas
  - what is the first priority
    - and the ones after that
- I -
  - solid development
  - TDD
  - making sure to communicate with other team members throughout
  - speaking with QE to integrate testing
- I -
  - begin with the right tools
  - consider the language
  - consider those needed to develop it

- Consider an appropriate model - talked about some of the positives of the AGILE model - with morning standups and such promoting good communication
- pair programming

## Joao

J -

- lay out a plan for what needs to be done - speak with the customer and understand what they want
- make a plan of action
- risk assessments of all kinds

J -

- budgets
- cost
- time
- the customer
- resources
- contract specifics
- profit

J -

- be really obnoxious and constantly micromanage staff so can feed this back to customer
- facilitate communication
- get the best set of expectations possible
- get an accurate picture of what is needed from the customer so it can be translated into reality (realistic too)
- set realism to costs, and time frames and such

J -

- 'good' management style generally - good team cohesion
- ensure that team management is strong
- good diagramming - to make sure that the overall process and project/product is well organised

## Adam

A -

- main test creation -
  - what to test

- when to test
- how to test
- test design
- test execution
- defect reporting and tracking
- test closure and sign off
- work with the owner and the dev to understand needs
- making everything intuitively readable
- prepping for the maintenance phase of any process

A -

- test planning
- test designing
- ^ both in the planning stages
- ensuring the the team is aware of the need for testing and its integration
- promoting testing generally

A -

- tests - bug prevention removal
  - tracking of defects and bugs
  - improving the overall longevity of the code
- A -
- extra levels of automatic integrated testing

## Late on i.e. after most of the development is done, soon before it will be shipped

- What are your responsibilities?
- What are your main concerns? What matters most to you at this stage?
- What can you do to help improve the quality of the program?
- What other things can you effect - are there processes, tools, lines of communication, etc. where the quality of those can be improved? Could those improvements indirectly improve the quality of the program?

### Ibrahim

- no new development
- feature freeze

- but working close with the others to make sure any defects/bugs that can be removed are removed as fast as possible
- security is built in properly
  - don't want to release a product that is dangerous
  - company rep etc

## Joao

- become more aggressive with time management
- pay cuts for slackers
- everyone is working weekends
- indepth look at what is happening
- wide team meeting - re contact the client/customer
- make sure what we have is a good product, that it matches the spec  
this would all be done throughout too

## Adam

- is there a need for early access/ or beta alpha etc
- checking the tests through
- test report sign off
- defect report if needed

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## Important points

- a lot of how we would operate would probably be based on how the company operates
- and the project itself
- MVP - minimum viable product

- not everything, but we have achieved enough this time round
- lots of the points we raised would need to be a consideration throughout the process not just at a phase by one person
  - 3 Ps
    - people
    - process
    - product
  - disagreements
    - nope
  - difficulties
    - no real knowledge of the product or project
    - potentially bad staff
    - environmental factors
    - staff sickness
    - employment based issues
    - possibility of poor staff
    - role redundancy planning
  - questions

## Risks (Solo exercises)

Imagine you run a Bed & Breakfast website for a particular "B&B" of 4 uniquely decorated rooms. Your website allows people to see the availability of rooms on dates, to book rooms and pay online.

Think through possible risks that you, as the administrator (having responsibility for designing it, maintaining it, and so on) of the website need to take into consideration.

Once you have a set of risks you're happy with, work through the likelihood and severity of each.

Prioritize the risks using their overall risk level.

### HIGH severity & High Likelihood

- general website going down/not loading
  - if not configed properly
- error in inputting

- maybe high maybe low - depends

## HIGH severity & LOW likelihood

- payment insecurity/security
- failure in the date/booking system leading to either unbooked rooms appearing booked (failed cancellations) or likewise double booking
- server being up etc
- specific website going down - DDOS, data theft etc

## LOW severity & HIGH likelihood

- refund process
- cancellation process

## LOW severity & LOW likelihood

- emergency decorating etc

Suggest mitigation strategies for those you consider need attention. This may not be all of them - you might decide some are not risky enough to worry doing anything about.

- make sure the website is set up correctly
- secure practices with payments and refunds
- back up server options
- back ups in the server
- website testing and maintenance
- check rooms between visits for needed diy
- email verification
- 2 forms of contact to help against human error
- have tests and checks in place for dead links etc
- be responsive to customers and their issues and they are a manual form of testing for things

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## How might you make a room secure?

- essentially you need to work out what security is
- and then if you know that - what you are securing it from

## Access?

- if it is about access - then just make a room that cannot be entered, one that has no ability to have any movement of 'anything' be it people, data or matter in or out of it

### Office room in house

- this leads me to assume it has a door - and that wants a basic level of security
- physical windows and doors are strong and hard to break
- locks are of high and complex quality
- there will be multiple fail safes for these
- the equipment
  - computer encrypted
  - 2fa
  - secure and backup secure line to communications
  - multiple forms of external access, all of which secured in multiple ways
  - electricity
  - etc

### Office in a company

- same as above in many ways - BUT with added or changed elements
  - needs to be free moving and have the ability to have many different actors move in and out in a secure way
  - much greater access control and potentially surveillance needs
  - if the office is big in size then more physical stuff
  - if it is big by name or reputation - maybe it attracts more attackers - then it will need an even more hardened form of data protection etc
  - physical security guards and extra measures
  - protocol
  - different shifts and teams of protection
  - police involvement
  - registration of business and practices - civil protection
  - etc

### If it is a home and it is a baby's room

- this context will make you think of things that a baby needs

- still needs all of the above kinda things, baby monitors and cameras don't want to be insecure
- but the focus will be on physical elements traditionally more than others
- good bed
- good source of blankets, towels
- sanitary
- sanitary products
- if a bit older then you need to ensure there is nothing the baby could interact with that would harm it or the thing it is interacting with
  - electric ports
  - lights
  - choke hazards
  - pets
  - strangulation
  - pointy or hard objects
  - fall hazard
  - smoke alarms and shit
  - etc
- as it grows the context of 'secure' will change
- a toddler will want to have toys
- a teenager will probably want computers and privacy and other tech like things maybe
  - maybe other stuff idk - i wanted computers and stuff
- all of these will want the 'security' of basic human needs, insert some cliche here about mazlows hierarchy of needs or something
  - love
  - protection
  - blah blah blah
  - they want to *feel* safe

room could have a specific need  
like a prison cell or (sadly similarly) a hospital room

- prison will have a much greater focus on security and punity
- Panopticism will be relevant in both
- surveillance too

- lack of agency will be restricted in both
  - expected authority will be there in both too - prison guards, doctors w/e
  - these rooms will need to have a completely different concept of 'access' very restricted for different reasons
  - both could have infection control
  - both may determine whether the 'person' is allowed to leave and what they are allowed to do
  - both can cause long term effects
    - it is the room's responsibility along with the institution to try and make that effect positive
      - healed/ rehabilitated
      - rather than negative
        - institutionalized - PTSD
        - or in prisons 'upskilled'
  - a hospital is secure if the needs of the patient and the institution are met just the same as any other room
  - the prison's room is there to keep the prisoner in, restrict their existence, and keep others out
  - the hospital's room is there to keep the person in, but only to heal them, and to only allows those who are authorised in
- Similar really...

## other rooms

- Gym - room is secure if it follows Health and safety
- swimming pool similar
- dojo similar
- town halls
- library
- cinema
- restaurant etc

all have diff needs

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# Phase two - More on Quality & Exploratory Testing

## Quality across the organization

### Stakeholders

Literally, a Stakeholder is anyone or any group that has a stake or interest in the outcome of a project. A stakeholder could be someone like a project manager or product owner within the company, or they could be a representative at the company that made the request and is financing the project.

For now, we will work from this one even though there are variants

### SDLC

#### 1. Requirements & Analysis

1. At the beginning of a project, requirements can be gathered from someone like a customer. These are likely to come from analysing problems they want solving or could be from an internal person who is proposing a new ideas perhaps to target a new market.

#### 2. Project Planning

1. Groups including stakeholders and senior members of the teams plan the project. This is likely to involve things like timescales, resourcing, risks, contingency plans, opportunities and so on. It might result in a plan to amend something that already exists or to create something new.

#### 3. Design

1. People in roles such as system architects and developers, as well as hopefully test engineers, use the previously generated requirements to produce designs of how it could work. This might involve factors like other products with which this would need to integrate, and is likely to result in multiple designs from which stakeholders would choose just one.

#### 4. Coding & Implementation

1. Developers will use the prescribed design to write code in order to implement the program or changes. This work is often done according to coding standards or guidelines, following processes like test-driven development.

#### 5. Testing

1. As noted elsewhere, testing could/should be happening at more stages than just one after coding and implementation. However, there are activities that more naturally occur later in the cycle, after much of the implementation is done, such

as user acceptance testing (UAT) to check whether the implementation satisfies the original requirements and will be an acceptable solution for the users.

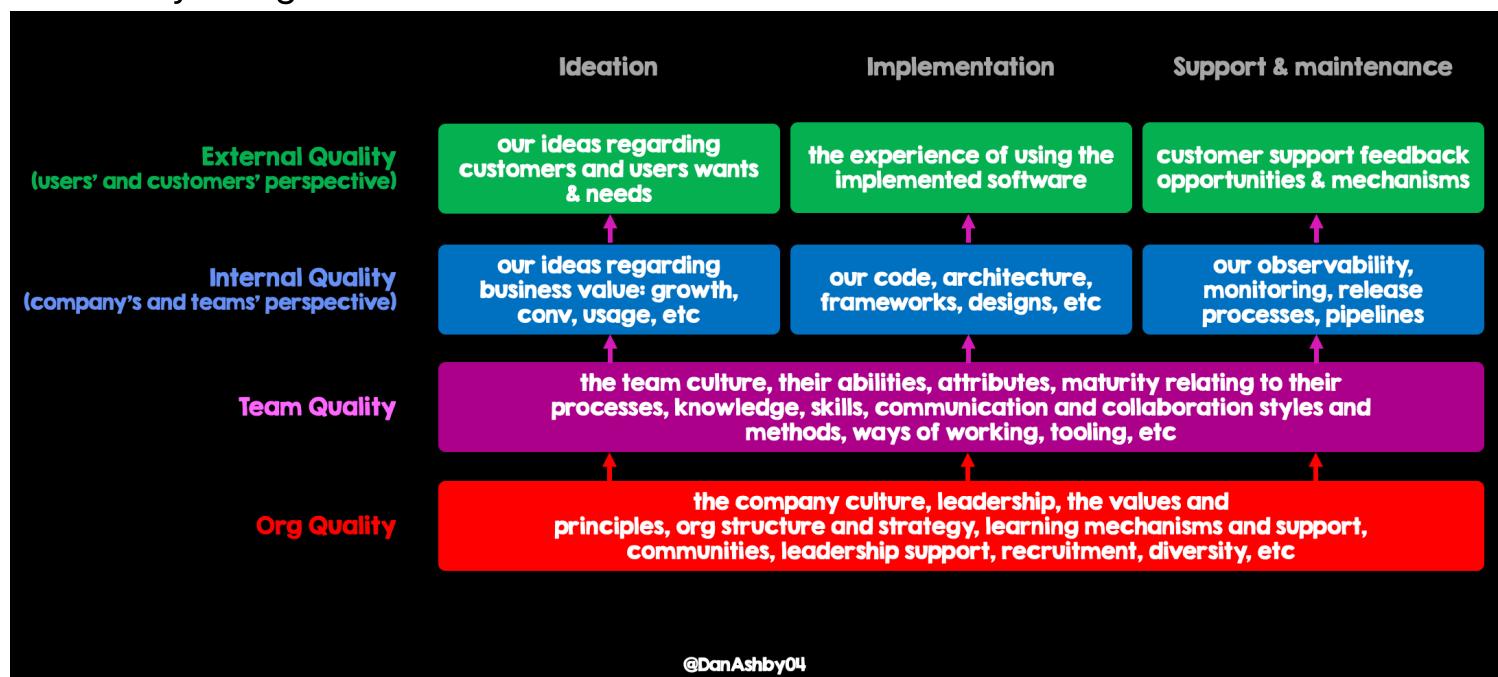
## 6. Deployment

1. The project is then released to the customer. This could happen in different ways, for example by making it available to them through an in-house cloud deployment, or by shipping it to the customer to install and use. Customer Support may be involved at this stage, helping to support the customer through installation and/or their first-use of it.

## 7. Maintenance

1. After the project is released, real world customer usage may highlight problems that need to be quickly patched or supported by teams such as Customer Support. So a Maintenance phase looks at life after Deployment.

Dan Ashby - diagram



## Exploratory Testing

just getting a user or even better an expert to try and use the thing see what works and doesn't - mainly for big bugs

The key is the first word in the term - exploration - and is a learning journey that can inform lots of things:

- The tester, about how the product works
- The tester, about what might be worth testing next
- Subsequently, stakeholders/developers/etc. about where there are problems

to manage time investment - **Timeboxing**

One thing that can be done during exploratory testing is "timeboxing" the activity. This means you set yourself a time limit and explore the product until that time is met. After that, you write up what you did, what you found, and report back.

By **timeboxing** our activities:

- We can focus better on trying to achieve what we planned, by choosing when to move on to a new area
- We give ourselves a proper stopping point rather than have the exploration run on too long/forever and not provide timely feedback
- We can use the end of the time to review what was done, sometimes resulting in a new - timeboxed - exploratory testing session to look at something else or something a second time but in a different way

## Note-Taking & Reporting

An important activity to do during exploratory testing is to take notes while you're exploring.

If you think - I can just write them at the end, can't I? - then there's a few reasons why that's not advisable. By writing notes as you explore:

- you don't forget what things you've explored or what tests you've already run, so you know what's next during, and what to put in a summary at the end
- you are producing documentation that shows that tests were run and what those were, which can be important for things like auditing
- if you find a potential issue, you can look back at the steps that lead up to it (this can be very important - more on this, later)

Similarly, producing a final report of your exploratory session is important as well:

- A stakeholder can more quickly understand what was done, what was found, and sometimes crucially what was not done
- It can allow a peer, such as another tester, to review what was done and make suggestions - these could be about further tests that could be run, through to interpretations of behaviour and whether the observations might actually be issues which need a follow-up
- Like before, for auditing purposes

- Materials to support the testing are documented and preserved, and perhaps can be reused in later sessions or contribute towards automation efforts

## Exercise - exploring part 1

□ myform.html

□ confirmation.html

□ style.css

1. Read up on what it is you're going to explore - that's the Application as written above (max 5 minutes)
  2. Think about what you're going to test, how and why (e.g. 20 minutes)
- Decide how to divide your time i.e. how long you want to spend planning, exploring then writing things up
  - Read up on email address syntax and think about what's considered to be acceptable or unacceptable; for example, [https://en.wikipedia.org/wiki/Email\\_address#Syntax](https://en.wikipedia.org/wiki/Email_address#Syntax) has some details
  - Start writing down some email addresses that you might want to test - perhaps your own could be the first on a "valid" list (don't worry - you're not accidentally signing up to anything in reality!)
    - [7adam7@gmail.com](mailto:7adam7@gmail.com) - valid
    - [7.adam7@gmail.com](mailto:7.adam7@gmail.com) - invalid due to .
    - "[7.adam7](mailto:7.adam7@gmail.com)"@gmail.com - allowed as in quotes
    - "[7 adam 7](mailto:7 adam 7@gmail.com)"@gmail.com - allowed spaces in quotes

- 7 adam 7@gmail.com - not allowed due to spaces
  - 7()adam7@gmail.com - not allowed
  - 7"adam7@gmail.com - not allowed
  - 7,adam7@gmail.com - not allowed
  - 7;adam7@gmail.com - not allowed
  - 7:adam7@gmail.com - not allowed
  - 7<adam7@gmail.com - not allowed
  - 7>adam7@gmail.com - not allowed
  - 7[adam7@gmail.com - not allowed
  - 7[a]dam7@gmail.com - not allowed
  - 7\adam7@gmail.com - not allowed
  - 7adam7@gmail.com should be same as 7ADAM7@GMAIL.COM
  - (comment)7adam7@gmail.com - allowed as commented is a comment
  - for more see wiki lists
- 
- Consider how you might group the email address ideas you already have - perhaps they're all valid ones at the moment (and you need some invalid ones as well) or perhaps you're currently focusing on what's written before the "@" symbol

- eg of after the @ on wiki
- Write up some top-level categories of your email address ideas, then break each of those down (and break those down again if appropriate) - there's an example of this, below; you don't have to follow this exact pattern - there are no single correct approach
- Lastly, come up with email addresses for the ideas on your broken-down "tree" of areas and categories

## Case List

### Name and Age

- With valid email ([7adam7@gmail.com](mailto:7adam7@gmail.com))
  - Adam - 30
    - Correct entry - valid response
  - 123456 - 40
    - Incorrect entry - treated as valid
  - 123456 - Adam (wrong way round, both fields incorrect)
    - Incorrect entry - treated as valid
  - Adam - 123456 (age is highly impossible)
    - Incorrect entry - treated as valid
  - £&Q&! - £&Q&!
    - Incorrect entry - treated as valid
- with invalid email
  - Adam - 30 - [7;adam7@gmail.com](mailto:7;adam7@gmail.com)
    - 'That's not a valid email address!'
      - Note the name of the popup has a globe and then file:// which is odd
  - 123456 - 40 - "7<[adam7@googlemail.com](mailto:adam7@googlemail.com)""
    - 'That's not a valid email address!'

Note - it appears that the form is only checking the email address section for validity. Invalid name entries and age entries are used, but whether the form is accepted is only

ever down to the email field.

Email Addresses - with any age and name details it seems.

- Valid
  - before @
    - letters
    - numbers
    - combination
    - special characters
    - quotes and comments
  - After @
    - letters
    - numbers
    - special characters
    - quotes and comments
    - .com .co.uk etc
- Too Long (over 64 Char)
  - `1234567890123456789012345678901234567890123456789012345678901234+`  
`x@example.com`
    - INCORRECT - should not be valid
      - Also note - the page seemed to stall when processing
- Invalid
  - before @
    - letters
    - numbers
    - special characters

- 7.adam7@gmail.com - CORRECT
- 7 adam 7@gmail.com - CORRECT
- 7()adam7@gmail.com - CORRECT
- 7"adam7@gmail.com - CORRECT
- 7,adam7@gmail.com - CORRECT
- 7;adam7@gmail.com - CORRECT
- 7:adam7@gmail.com - CORRECT
- 7<adam7@gmail.com - CORRECT
- 7>adam7@gmail.com - CORRECT
- 7[]adam7@gmail.com - CORRECT
- 7[a]dam7@gmail.com - CORRECT
- '7\adam7@gmail.com' - CORRECT (Backslash)
- ada%m@gmail.com - INCORRECT - should all be valid in use

• !#\$%&'\*+-/=?^\_`{|}~

- quotes and comments
  - "7.adam7"@gmail.com - INCORRECT (quotes should make valid the .)
  - "7 adam 7"@gmail.com - INCORRECT (quotes should make valid the .)

- Adjusting @

- 7adam7@gmail.com - CORRECT
- 7@adam@7@gmail.com - CORRECT
- 

- After @

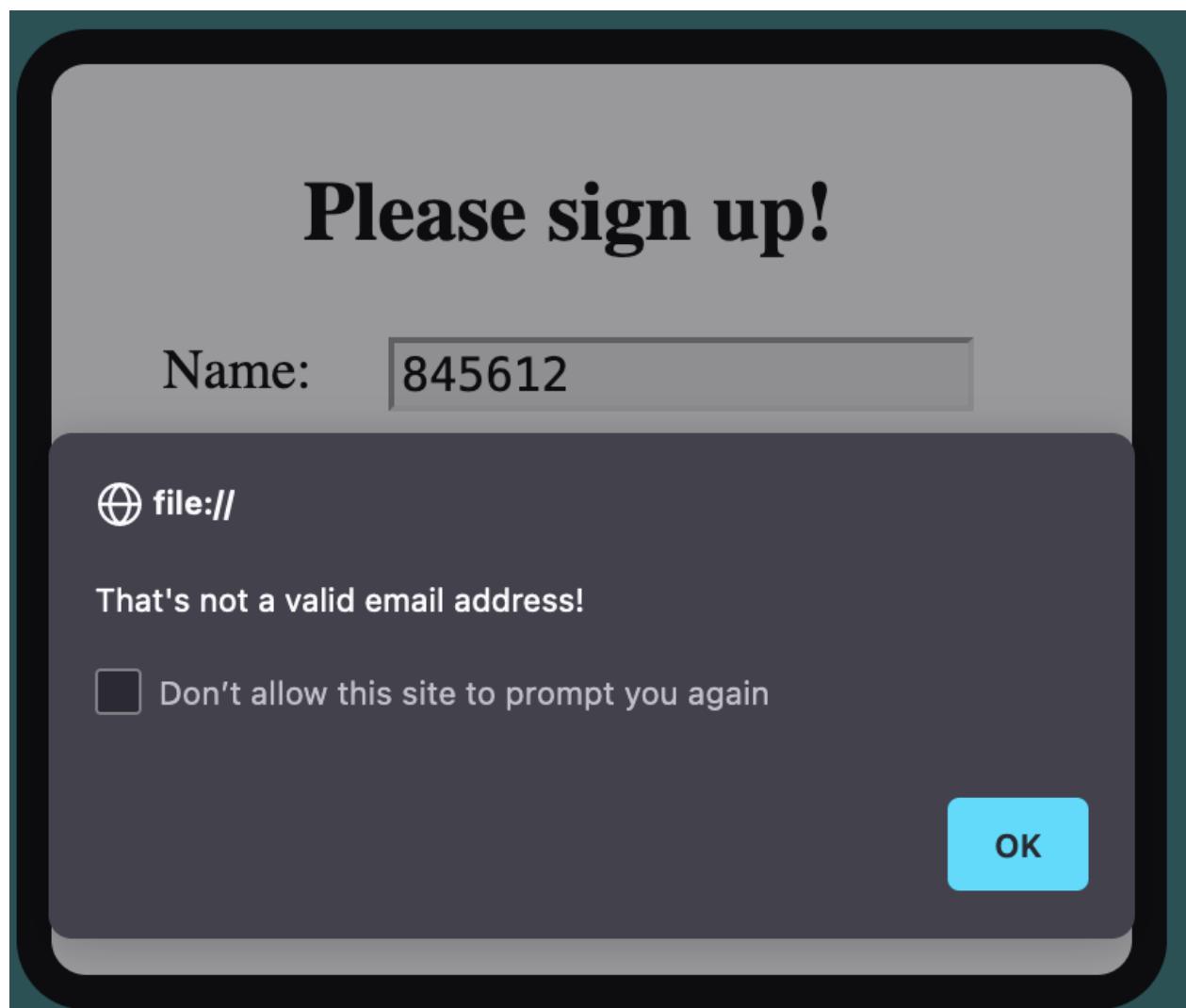
- letters
- numbers
- special characters
- quotes and comments
- .com .co.uk etc
  - .ch - INCORRECT

- Duplication

- CaseSensitivity
  - upper and lowercase should make no difference

- no way to determine this
- Length
  - Too long (over 64 char)
    - Came back as VALID
- Other
  - CORRECT - kay's rickroll just came back invalid

Note - after a period of attempts the popup adds a check box to say 'don't allow this site to prompt you again' (running firefox)



## Summary

- Name field - Appears to have no checking at all
- Age field - Appears to have no checking at all
- Email Field -
  - needs to have the criteria looked at. Was accepting emails too long.

- Was also rejecting valid emails - based on format, characters used and domains they are at, eg use of some special characters that should be ok - were rejected, some domains like .ch were rejected
- Was good to see that many of the correct ones did work, and that basic levels of input validation are in place (even if this is in the form of strict rejection of entry)

## Recommendations:

- implement input validation in Name and Age fields considering:
    - length
    - realistic expectations (eg name of a certain length, char type or age that is actually livable and)
    - consider setting input for age to just int of <120 for example
    - and for name explore the options around what is a valid name
  - Re work the email checking field
    - look over valid email options and formats and create a set of rules that applies this to the form
    - both for acceptable ones
    - and unacceptable ones
    - make sure if opening it up - to keep some security in mind
  - Overall/other -
    - create a checking system for entries
    - duplications
    - existing ones
    - email verification for sign up - say no to spam
    - max entry limit to stop overloading
    - rework the popup and add others to meet and specify the error more clearly
- 

Take a moment now to think back to the exercise you just did with the sign-up web form.

- Did you take notes?
  - yes
- Did you take enough or too many/few?
  - I think in places too many (eg the special char)
    - once there is a clear issue - evidence it and move on
  - and in other areas maybe needed at least 1 eg to be sure

- How did it feel taking notes as you went?
  - went fine - like notes, I am sure i would develop a flow and template for this kinda thing
- How did you take notes (pen & paper, VS code/text editor, etc.)?
  - obsidian
  - would be happy with any similar tb
  - always liked hand written - just its slow and the readability is poor for me
- What format did they take (linear as time progressed, something more complex)?
  - bit of both
- Were your notes more about behaviours and outputs, or learning about the form and new ideas, or a mix?
  - bit of both again
- Did you take any other forms of notes, like copies of output text, screenshots, videos?
  - just the one screen

## Mind Maps

excalidraw

have heard good about draw.io too

## Challenge

### Introduction to testing day 2 Challenge Report

## Report

### Task:

### And how each is achieved:

- create 5 test cases about a program with no initial contact, equipped with a basic description
  - Read through provided information and created test cases
- To provide running notes
  - Recorded the exercise to provide full visual, gave a running commentary, and wrote notes live
  - Ran the test cases as advised by coaches using terminal (iterm - mac os - python 10.11.1)

- Summarise findings
  - please see summary below
- All to be submitted upon completion

## Program expected Specification:

Wraps given text to a given character limit and inserts new line markers - followed by "-END OF FILE--"

- Name - wrap\_it
- Argument - string - english text AND Int - character length of line

Run from terminal as such:

```
$ python3 wrap_it.py 26 "a quick brown fox jumps over the lazy dog"
```

## Summary of test cases and notes

1. example output with expected inputs - all working fine.
2. Small CHAR input broke the running of the program, with no catch or return output clause for this.
3. Input that is within CHAR range but with no space to break the text - broke program, with no catch or return output clause for this.
4. Standard input with CHAR (new line break) limit exactly in the centre - all working fine.
5. Invalid entry in the form of an INT rather than a STRING - unexpected result, but did not break the program.
  1. Same entry as a string - all working fine

## Further Details regarding test case 5

- It was interesting that other tests (2, 3) lead to the program breaking due to an abnormal input
- 5 did not do this despite being and INT rather than a STRING
- The STRING version of this still functioned fine - so the length and other parameters are unlikely to be the reason
- Despite there being no 'catch' or 'response' when giving an incorrect input (as found so far) the program executed fine with the parameters given in 5

- Would recommend further tests to explore this and give other 'incorrect' inputs as well as explore why the given one in test 5 was 'ok' to run.

Of course would recommend if it is within the scope of the project, that the code be reviewed based on potential errors/bugs found.

## Introduction to testing day 2 Challenge notes and findings

# Test cases and running notes

## Test Cases

1

- Test purpose
  - See whether the example in the program description produces the output it says it should
- Text input: a quick brown fox jumps over the lazy dog
- Wrap limit: 26
- Expected output:

```
a quick brown fox jumps  
over the lazy dog  
--END OF FILE--
```

### Notes -

- works as expected
- 

2

- Test purpose
  - using a smaller number and string - one that would break up the words and create many broken lines
- Text input: hello my name is Adam
- Wrap limit: 2
- Expected output:

(similar to the below unaware of exact wrapping implementation - from the example it seems likely that the wrapping rounds down to the last full word the first actual printed line is 23 CHAR, but 26 does not include another full word)

```
he  
ll  
o  
my  
n  
am  
e  
is  
ad  
am  
--END OF FILE--
```

alternatively it may just clip the word it is within if the alternative would be 0

```
hello  
my  
name  
is  
Adam  
--END OF FILE--
```

## Notes -

```
→ Downloads python3 wrap_it.py 2 "hello my name is Adam"  
Traceback (most recent call last):  
  File "/Users/adamlittle/Downloads/wrap_it.py", line 48, in <module>  
    lines = wrap_me(sys.argv[2], int(sys.argv[1]), [])  
           ^^^^^^^^^^^^^^^^^^^^^^^^^^  
  File "/Users/adamlittle/Downloads/wrap_it.py", line 21, in wrap_me  
    split = text[:limit-1].rindex(" ")  
           ^^^^^^^^^^  
ValueError: substring not found
```

- error given
- not compensated for with an error message or a catch of some kind

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## 3

- Test purpose
  - CHAR limit over the length but with no space to separate by
- Text input: a quick brown fox jumps over the lazy dog
- Wrap limit: 26
- Expected output:

```
aquickbrownfoxjumpsoverthe  
lazydog  
--END OF FILE--
```

Or an error/exception asking for spaces

### Notes -

```
→ Downloads python3 wrap_it.py 26 "aquickbrownfoxjumpsoverthelazydog"  
Traceback (most recent call last):  
  File "/Users/adamlittle/Downloads/wrap_it.py", line 48, in <module>  
    lines = wrap_me(sys.argv[2], int(sys.argv[1]), □)  
           ^^^^^^^^^^  
  File "/Users/adamlittle/Downloads/wrap_it.py", line 21, in wrap_me  
    split = text[:limit-1].rindex(" ")  
           ^^^^^^  
ValueError: substring not found
```

- same error - different input
  - not account for this kind of input with some sort of return value
    - eg printing - you must have spaces!
- 

## 4

- Test purpose
  - to see how the program will deal with a word that is evenly split along the CHAR limit
- Text input: hello adam smith
- Wrap limit: 8
- Expected output:

```
hello  
adam  
smith  
--END OF FILE--
```

### Notes -

- worked as expected
- 

## 5

- Test purpose

- See whether the example in the program description produces the output it says it should
- Input: 1 2345 678910 111213141516 1718
  - Input: "1 2345 678910 111213141516 1718"
- Wrap limit: 26
- Expected output:

`invalid entry`

### Notes -

- when entering the input as multiple 'int' separated by spaces as show
  - output:

`1  
END OF FILE`

- when entering the input as multiple 'int' separated by spaces as show
  - output:

`1 2345 678910 111213141516  
1718  
END OF FILE`

## Phase 3 - Bugs, Psychology & Planning

- every day communication
- consider the people and the audience
- consider ways of providing advice/criticism etc etc
  - avoid - you, why, completely broken etc etc
- when it comes to stake holders
  - give the facts
  - give regular updates
  - be fair/realistic don't exaggerate risk, but don't underplay it either
- Don't become a gatekeeper to the software
  - testers becoming a bottleneck is a bad thing
  - testing will not protect or fix against everything anyway

- testers becoming the blame
- customer service
- unconscious bias training
- emotions and maths - don't need to mix...

## Conjunction effect

It's also possible that the actions leading up to the observation have put the application into a particular "bad" state, or equally that they were all irrelevant and the single, final action we did is the only important bit.

More detail means more likely (not accurate)

- confirmation bias
- correlation vs causation
- critical thinking
- dopamine and others

## Terminology

- **Error** - human mistake
- **Bug/defect** - when everything is right but the programme doesn't perform as it should
  - a bug is an error in the software that causes it to malfunction
  - some place defects as a flaw in a product that reduces usability or value
- **Failure** - End user action, does not perform what it is supposed to

## Bug reporting

- **Bug/defect** - when everything is right but the programme doesn't perform as it should
    - a bug is an error in the software that causes it to malfunction
    - some place defects as a flaw in a product that reduces usability or value
- Neil personally doesn't like defect as a term and finds it is negatively loaded

Where might we report?

- A ticket on an electronic kanban system, such as a Trello board.
- A post-it on a whiteboard, or on a developer's desk.
- A comment in a team Slack channel.

- A verbal conversation ("I have a bug to report to you").

## Need to have good bug reports

- Title/summary
- Description
  - steps to recreate - and why it matters
- severity/priority
  - **Severity:** A bug's impact on the overall functionality of your application. This might range from Low (a problem which users might not even notice) up to Critical (nobody can access the application at all).
  - **Priority:** How urgently the team should seek to fix the problem. This might range from Low (it's not important to fix right now) to High (it should be fixed at the earliest possible opportunity).
- other bug metadata
  - **ID:** Most electronic reporting systems will give you some sort of unique bug report ID whenever a ticket is created (for instance, [MAK-123](#) ).
  - **Reporter:** The name of the person who reported the bug. If you reported it, this will be you! This means that others are likely to come to you in the future with questions about the issue. Importantly, this means that one of the audiences for your bug report is **you** - if you revisit a bug report in a year's time, will you be likely to remember/understand what the problem was?
  - **Assigned To:** Depending on how your system is configured, this might default to "Unassigned", or there might be a default assignee (such as your team's Product Owner). Or, your team might be asked to determine the best person to assign a bug to.
  - **Status:** Newly-reported bugs will have a default state, such as Open, or Pending Triage. As bugs are reviewed and dealt with, these will move through a workflow which your team has predetermined, probably passing through statuses such as Fixed and Closed. However, not all statuses will result in a bug being fixed: some common "invalid" statuses are Won't Fix, Duplicate and Cannot Reproduce. Can you think of what might cause a bug to end up in one of these states, and how it could be avoided?

No need to bother reporting:

- basic enough that it will be fixed straight away

- a bug that everyone agrees will never be fixed - ie it is really low severity and really low priority

## Exercise

TheMany172 commented 1 hour ago



### (email validation) - NAME and AGE fields lack sufficient input validation

#### Description

Both the 'Name' and 'Age' fields in the form lack sufficient input validation. Within the tests carried out the form would only appear to respond to entries made within the 'Email' field.

When the user inputs either names or ages that would by all probability be considered incorrect, alongside an acceptable email entry, the form will proceed - taking those incorrect age and name entries.

This means that duplicate names, names that consist of only special characters, names that consist of just numbers - as well as - ages that are not numbers, ages that are not integers and ages that are not possible will all be accepted. This will mean that the data we are collecting is not valid or of use.

#### Steps to reproduce

Replicated on: Mac OS Ventura Version 13.1, using Firefox Version 108.0.2 (64-bit)

1. Load up the form by double clicking on the 'myform.html' file provided by makers
2. typing into the Name field: 123456
3. typing into the Age field: Adam
4. and using a valid email address: 7adam7@gmail.com
5. Then submitting, by either clicking 'Submit' button or by pressing enter/return key

Entry:

file:///Users/adamlittle/Desktop/Mega Sync/Attachments folder/myform.html

Please sign up!

Name:	123456
Age:	Adam
Email:	7adam7@gmail.com

Submit

Result after submitting:

(email validation) - NAME and AGE fields lack sufficient input validation #3  
TheMany172 opened this issue 1 hour ago · 1 comment

**Your fields were valid - you are signed up!**

Click [back](#) to have another go and sign up again...

This was also replicated with the following Name -- Age pairs:

- £&\*Q&! -- £&\*Q&!
- 123456 -- 40 (name not valid)
- Adam -- 123456 (age is impossible)

## Severity

**High** - High is given as this will in all reasonable probability lead to flawed data capture to the extent that invalidates the usefulness of the form

*(It is understood that this may be subjective if the needs of the form place no weight of importance on these fields, and that in actuality the email address is all that is needed. If this is the case then consider removal of the fields)*

## Priority

**High** - High is given as this kind of error is very likely

avipatel98 commented 9 minutes ago

...

This is a very well documented issue and is very readable and understandable, the importance of the issue has been adequately justified.

also

TheMany172 commented 37 minutes ago

...

## (email validation) - Form accepts duplicate information

### Description

Entering 1 set of data - followed by the same set a second time. The data is accepted both times rather than throwing some form of complaint the second time. This will lead to duplicate information over time.

Steps to reproduce

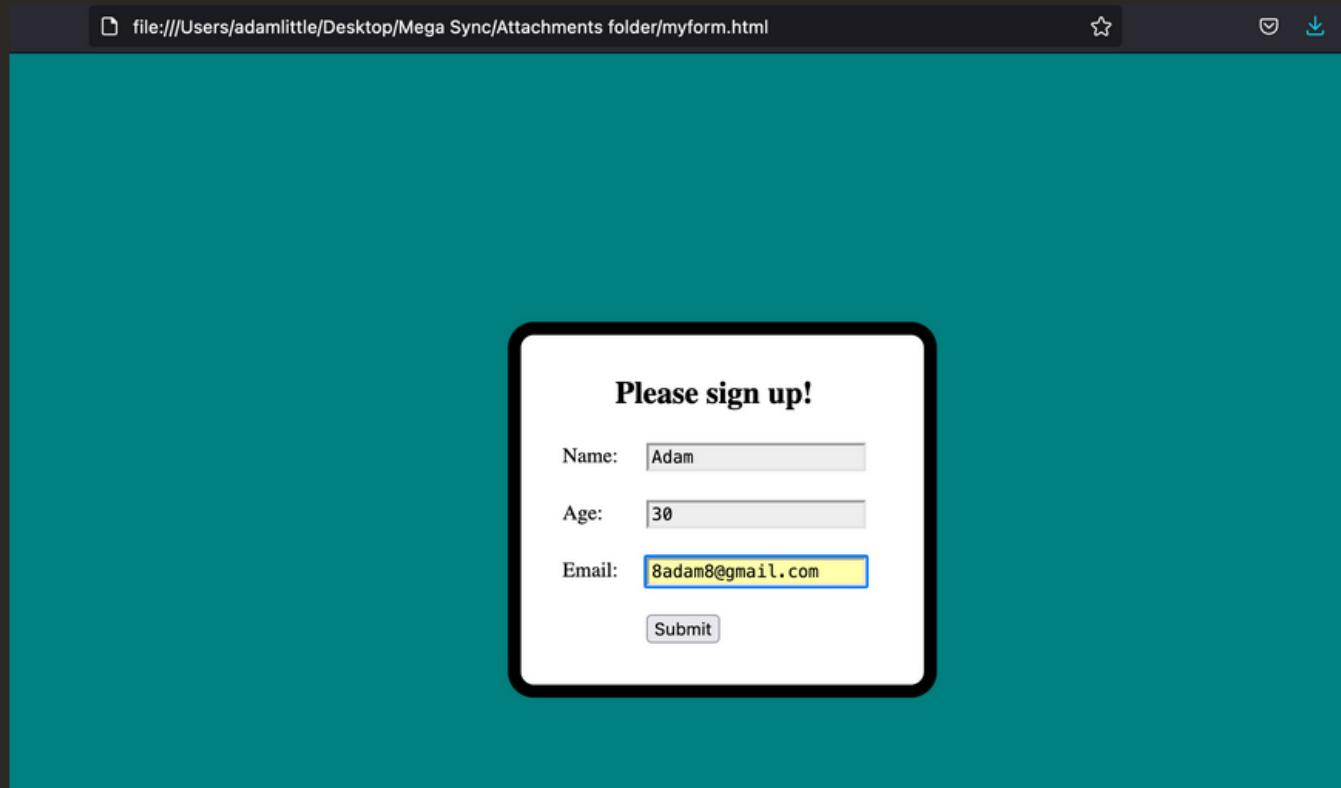
## Steps to reproduce

Replicated on: Mac OS Ventura Version 13.1, using Firefox Version 108.0.2 (64-bit)

1. Load up the form by double clicking on the 'myform.html' file provided by makers
2. typing into the Name field: Adam
3. typing into the Age field: 30
4. and using a valid email address: 8adam8@gmail.com
5. Then submitting, by either clicking 'Submit' button or by pressing enter/return key
6. Navigate back either by the back button or by reloading
7. re complete 2-5

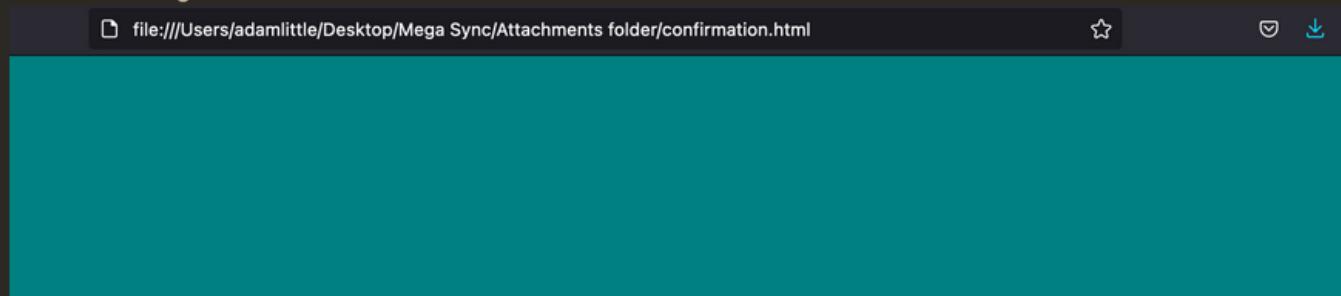
It was expected that this would throw some sort of error - or complaint. Instead the data is accepted.

Data entered second time (first was identical):



The screenshot shows a Firefox browser window with a modal dialog box centered on the screen. The dialog has a black border and a white background. At the top, it says "Please sign up!". Below that are three input fields: "Name: Adam", "Age: 30", and "Email: 8adam8@gmail.com". The "Email" field is highlighted with a yellow background. At the bottom of the dialog is a "Submit" button.

After submitting second time:



## Severity

**High** - High is given as this will in all reasonable probability lead to flawed data capture to the extent that invalidates the usefulness of the form. Depending on the email newsletter process, this may lead to duplicate emails. Company could be listed as a spam provider which comes with other possible sanctions.

## Priority

**Medium** - Medium is given as this kind of error is likely - but may not prove a problem depending on how the users interact.

avipate198 commented 17 minutes ago



This makes a lot of sense and is clear to understand why this is an important bug in the form submission page

also

TheMany172 commented 22 minutes ago



## (wrap\_it) - Program crash - low CHAR argument or 'no space' to separate string by

### Description

When entering a string and Char int as arguments - if the Char break is very low - or if the string contains no spaces, the program does not run. I expected that if the entry was incorrect that some sort of indication would be given as to why - such as a return output of 'Sorry you need to put spaces in your entry!' or 'Char break must be greater than 5'.

### Steps to reproduce

Replicated on: Mac OS Ventura Version 13.1, using Python Version 10.11.1

1. Downloaded the program as instructed by Makers, and navigated to it using Iterm (set up as instructed by Makers)
2. entering in to the terminal ~ python3 wrap\_it.py 2 "hello my name is Adam"
3. Pressing enter key
4. rather than the program running the following is returned:

```
+ Downloads python3 wrap_it.py 2 "hello my name is Adam"
Traceback (most recent call last):
  File "/Users/adamlittle/Downloads/wrap_it.py", line 48, in <module>
    lines = wrap_me(sys.argv[2], int(sys.argv[1]), [])
            ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "/Users/adamlittle/Downloads/wrap_it.py", line 21, in wrap_me
    split = text[:limit-1].rindex(" ")
            ^^^^^^^^^^^^^^^^^^
ValueError: substring not found
```

Similarly another entry that provides the same sort of response:

1. Downloaded the program as instructed by Makers, and navigated to it using Iterm (set up as instructed by Makers)
2. entering in to the terminal ~ python3 wrap\_it.py 26 "aquickbrownfoxjumpsoverthelazydog"
3. Pressing enter key
4. rather than the program running the following is returned:

```
+ Downloads python3 wrap_it.py 26 "aquickbrownfoxjumpsoverthelazydog"
Traceback (most recent call last):
  File "/Users/adamlittle/Downloads/wrap_it.py", line 48, in <module>
    lines = wrap_me(sys.argv[2], int(sys.argv[1]), [])
            ^^^^^^^^^^^^^^^^^^
  File "/Users/adamlittle/Downloads/wrap_it.py", line 21, in wrap_me
    split = text[:limit-1].rindex(" ")
            ^^^^^^^^^^
ValueError: substring not found
```

Note: for the first run through I expected an error to be thrown, or for the text to be split or for the word(s) to be just shown as 1 per line. Please see egs below:

1

```
he  
ll  
o  
my  
n  
am  
e  
is  
ad  
am  
---END OF FILE--
```

or

```
hello  
my  
name  
is  
Adam  
---END OF FILE--
```

 **(wrap\_it) - Program crash - low CHAR argument or 'no space' to separate string by #8**  
TheMany172 opened this issue 22 minutes ago · 1 comment

```
aquickbrownfoxjumpsoverthe  
lazydog  
---END OF FILE--
```

or

```
aquickbrownfoxjumpsoverthelazydog  
---END OF FILE--
```

## Severity

Critical - without adequate input validation, or at least clearer guidelines for use - it is highly likely the program will not function as required.

## Priority

High - Since the program crashing is likely

 **avipatel98 commented 14 minutes ago**  ...

This is a well documented and explained bug that causes the program to crash.

---

More excercise stuff:

# Analysis part 1

These exercises will give you the opportunity to practice or experiment with skills such as:

- Analysing materials like specifications, wireframe diagrams, etc.
- Thinking ahead and planning
- Designing/creating test cases, determining steps/actions, thinking about required setup (such as environments or installed applications), preparing test data, etc.
- Discussing with other testers so that more ideas, approaches, etc. are brought into the planning

## Banking Application

### Functional Specification

Specification Id	Details
BANK-01	User can enter username and password into a login page to log in to the banking application
BANK-02	User can view all of their accounts in one page
BANK-03	User can view details of a single account, including balance and transaction history
BANK-04	A transaction page allows a user to specify an amount of money, a from account and a to account
BANK-05	A transaction causes an amount of money to move from one account to another, altering both account balances appropriately

### Assumptions

To make this exercise a little smaller, here are some assumptions that you can make for the purpose of this given application:

- Users already exist in the system - there's no sign-up functionality
- Accounts already exist and already have money in them - there's no depositing, withdrawals, etc.
- Accounts are referenced by some sort of unique identification number (as shown in one of the wireframes)

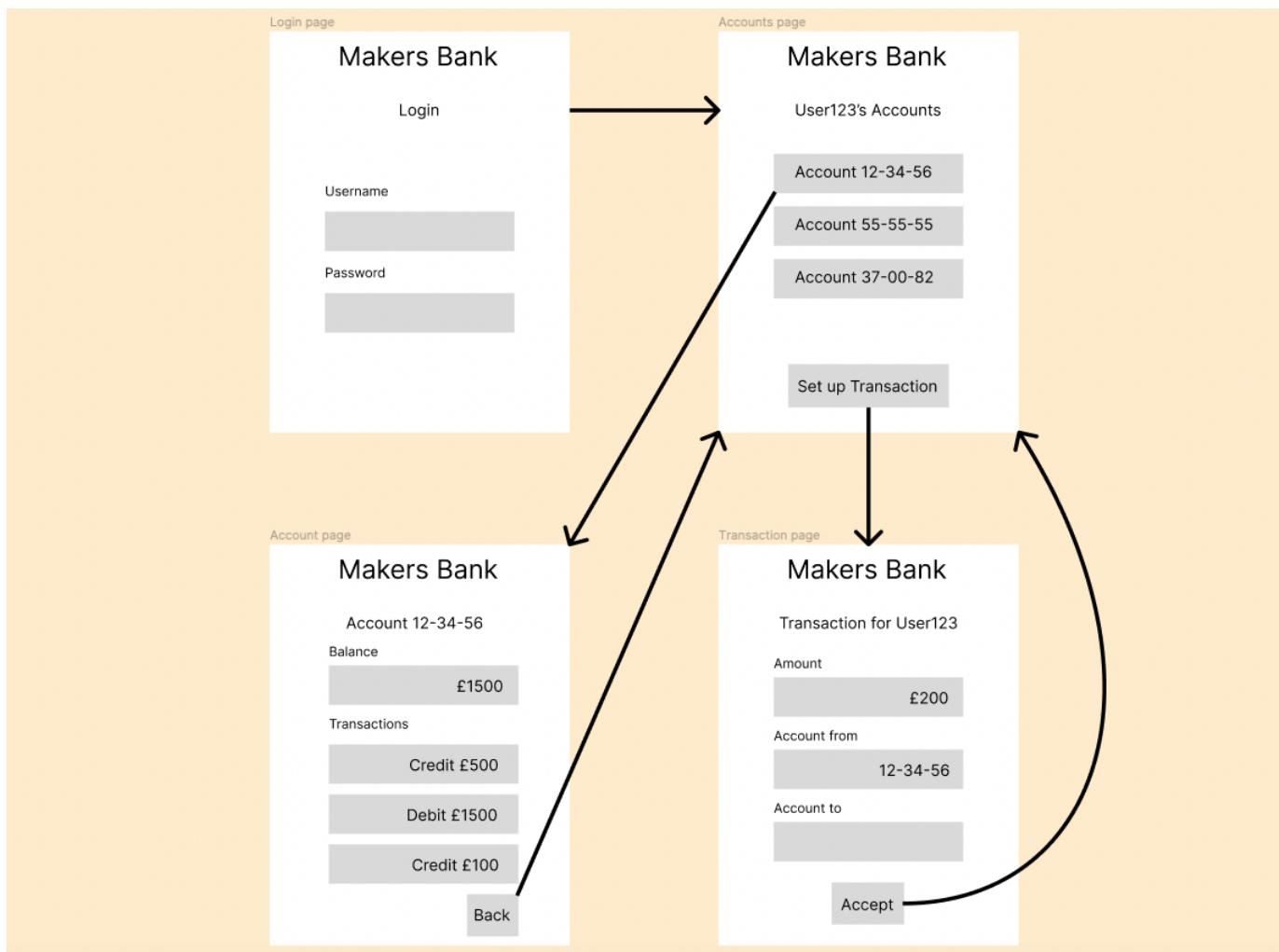
### Wireframes

Banking Wireframes

# Tree of test areas

- Login Page
    - Implicit function is to display log in fields 'Username' and 'Password'
    - Login with valid account --> view accounts
      - valid username box
      - valid password box
      - both of which are validated with a DB
      - Once satisfied - redirection to 'Accounts page'
    - Would expect the page to identify if either field has been entered incorrectly
      - this will not show the user anything but the login page and an error
  - Accounts Page (multiple)
    - Implicit function is to display a list of accounts for the valid account that has been logged into
    - Clicking on a list item within accounts --> redirect to that account on 'Account Page'
    - Clicking on 'Set up Transaction' --> Transaction page with the correct details
    - Would expect the page to not redirect to the wrong account, or any other page, upon clicking on an account
      - Same for the transaction button
  - Account Page (singular)
    - Implicit function is to display the details of the previously selected account - containing the account details at the top, the balance, and the (recent) transactions. At the bottom there will be a 'Back' button
    - Clicking 'Back' button will return the user back to the 'Accounts page'.
  - Transaction Page
    - Implicit function is to display an amount, account from and account to field, which can be entered into. There will be an 'Accept' button at the bottom
    - The form should be able to be filled out with valid details and 'accepted' by clicking the 'Accept' button.
    - Would expect account from - to be a drop down
    - Would expect the amount field to only accept a number that matches  $\geq$  the available balance associated with that account
    - Would expect account to - accept a valid bank account entry
    - Would expect any incorrect entries of any variation to return an appropriate error.
- Eg:
- The amount you have entered is invalid

- please select an account to transfer from
- please select an account to transfer to
- etc



## Assumptions:

- there should be a time out function
- biometrics 2fa otp
- confirmation messages for transactions etc
- that the entire application is as simple as is shown in their spec
- expect the currency to match the location and balance of the user
  - conversions implicit in transactions
- that everything is super duper secure
- that it works on all browsers and environments equally
- Users already exist in the system - there's no sign-up functionality
- Accounts already exist and already have money in them - there's no depositing, withdrawals, etc.
- Accounts are referenced by some sort of unique identification number (as shown in one of the wireframes)

## Questions for the person who wrote this:

- WHY?
- Is security built in? If so how/what?

Spend some time considering what the highest risks could be with this particular banking application as specified. What might "quality" mean in the context of this application, and from whose perspective?

## Risks

- unclear how things are secured (bank accounts and money is a big deal)
- 2fa otp etc etc appears not to exist
- Bank account numbers are small/weak
- privacy filter (overlay that fuzzes nonessential details)
- screen protection (screenshots etc)
- ways to log in - how the log in cache is stored on any device
- theft obviously...
- does the app have enough functionality to realistically keep users?
- input validation - injection, enumeration, spoofing etc etc etc

## What is Quality in this case?

- Security is a key factor
- usability and functionality
- Nicely designed - layout - smooth

## Hour number 1 - exploratory testing

1. can we navigate the pages with acceptable details to all the shown pages and verify that transactions have been worked
2. check each page with valid and invalid entries
3. check for timeouts on each page?
4. right user but wrong password multiple times - does this lock the account or similar?

## Analysis part 2

# Tree of test areas

What is it's role and how would we test it

- Home page (sign up page)
  - Role - landing page for website - where new users can sign up. Links to 'About' and 'Login' that direct to their respective pages. and makers logo/link
  - Tests
    - All links should redirect correctly
    - Email address, password and password confirmation fields
      - a valid account entry
      - an invalid entry
        - isolating each field
        - leaving them blank
        - all incorrect
    - Extra ways to break the fields
      - pasting in 100000 words eg
      - or scripts
- Login Page
  - Role - allow an existing user to log into their account (+ about and login page, and makers logo/link)
  - Tests
    - All links should redirect correctly
    - Email address, password fields
      - a valid account entry
      - an invalid entry
        - isolating each field
        - leaving them blank
        - all incorrect
    - Extra ways to break the fields
      - pasting in 100000 words eg
      - or scripts
- Spaces page (multiple)
  - Role - to display all the available spaces and to be able to filter them using available from and to fields (dates). Links - spaces, requests, signout, list a space. The spaces themselves should be clickable

- Tests
  - All links should redirect correctly
    - eg list a space should direct to the New space page
  - sorting function, valid date ranges
  - sorting function invalid date ranges
  - blank fields etc
  - multi click the list spaces button - see if it changes the listed spaces
- New Space page
  - Role - Form for entering the name, description, price per night, availability range (dates). Links - spaces requests, signout, makers, list my space
  - Tests
    - All links should redirect correctly
    - Each field can be entered into
    - test valid entry - list the space, see on the redirected spaces page
    - test invalid entries
      - negative numbers
      - invalid dates
      - name validation
      - malicious content
- Space page (singular)
  - Role - Show available dates - automatically display current month. This calendar should be navigable. Any unavailable dates are grey'd out. Dates can be selected by clicking to form a range and then you can click 'request to book' to request.
  - Tests
    - All links should redirect correctly
    - can navigate calendar
    - making sure invalid dates cannot be selected
    - make sure valid dates can be requested as above
- Requests page (multiple)
  - Role - Show a dashboard of requests made and received for the currently logged into account. Also be able to click on them to go to the relevant details.
  - Tests
    - All links should redirect correctly
    - page updates with other pages' actions

- Request page (singular)
  - Role - allow the user to confirm or deny correctly displayed requests for their 'spaces'.
- Test
  - All links should redirect correctly
  - page updates with other pages' actions

## Risks

### General:

- website going down
- web attacks
- etc
- dead links
- Home page (sign up page)
  - PID - data handling
- Login Page
  - skimming of login details
  - get in without logging in correctly
- Spaces page (multiple)
  - displaying of inappropriate material
  - invalid spaces
- New Space page
  - posting of inappropriate material
  - invalid spaces

- Space page (singular)
  - invalid booking requests
  - wasted admin time
- Requests page (multiple)
  - wrong data
- Request page (singular)
  - wrong data

## Assumptions

General:

- Navigating a made request allows you to edit it
- The page's diagrams are representative
- the sign up page and other areas do not allow duplication
- That the company/website supports positive and ethical work practices
- That the specification is accurate:
  - Any signed-up user can list a new space.
  - Users can list multiple spaces.
  - Users should be able to name their space, provide a short description of the space, and a price per night.
  - Users should be able to offer a range of dates where their space is available.
  - Any signed-up user can request to hire any space for one night, and this should be approved by the user that owns that space.
  - Nights for which a space has already been booked should not be available for users to book that space.
  - Until a user has confirmed a booking request, that space can still be booked for that night.
- That the email notification system works for all projected areas

## Questions

- What is your opinion on the controversy around the gig economy and the other ethical employment concerns that often arise from similar companies?

- What other implementation are you looking to add?
- Are you satisfied that the spec we have is comprehensive?

## First 90 min rough plan:

- Start with a full run through of the basic functionality
  - log in with valid details
  - click through the pages and list a space
  - make a booking on that space (with a diff user if needed)
  - check accept and reject
  - see if this shows on both accounts
  - check email verifications etc as well
- next would probably check all links between pages
- afterward would move on to using invalid information
  - logins
  - dates
  - prices/number entries as text etc
  - mess with the calendar

## Example of a test case:

### Test purpose

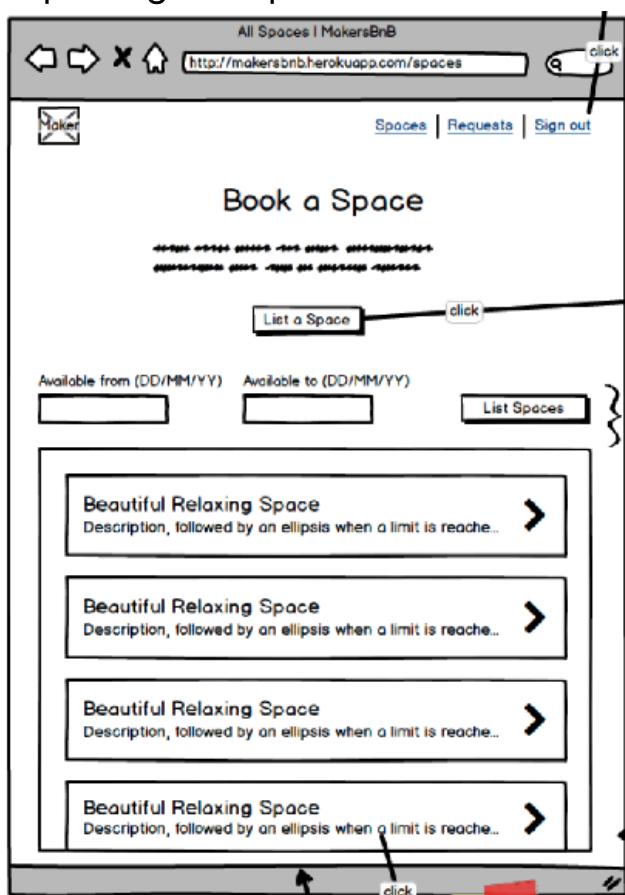
To see whether we can log in with valid details and get redirected to the correct page with the correct information

- load up the start page
- click log in link at the top right
- enter the valid information into the email address and password fields
- click login button below

### Expected output:

- expecting for no errors

- expecting to be presented with the real version of the page illustrated below

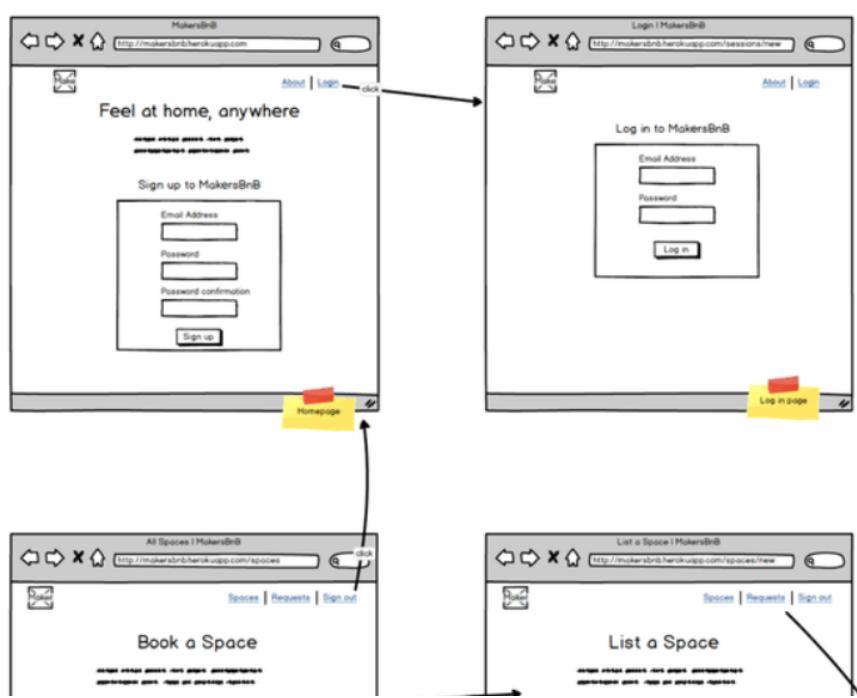


## Notes -

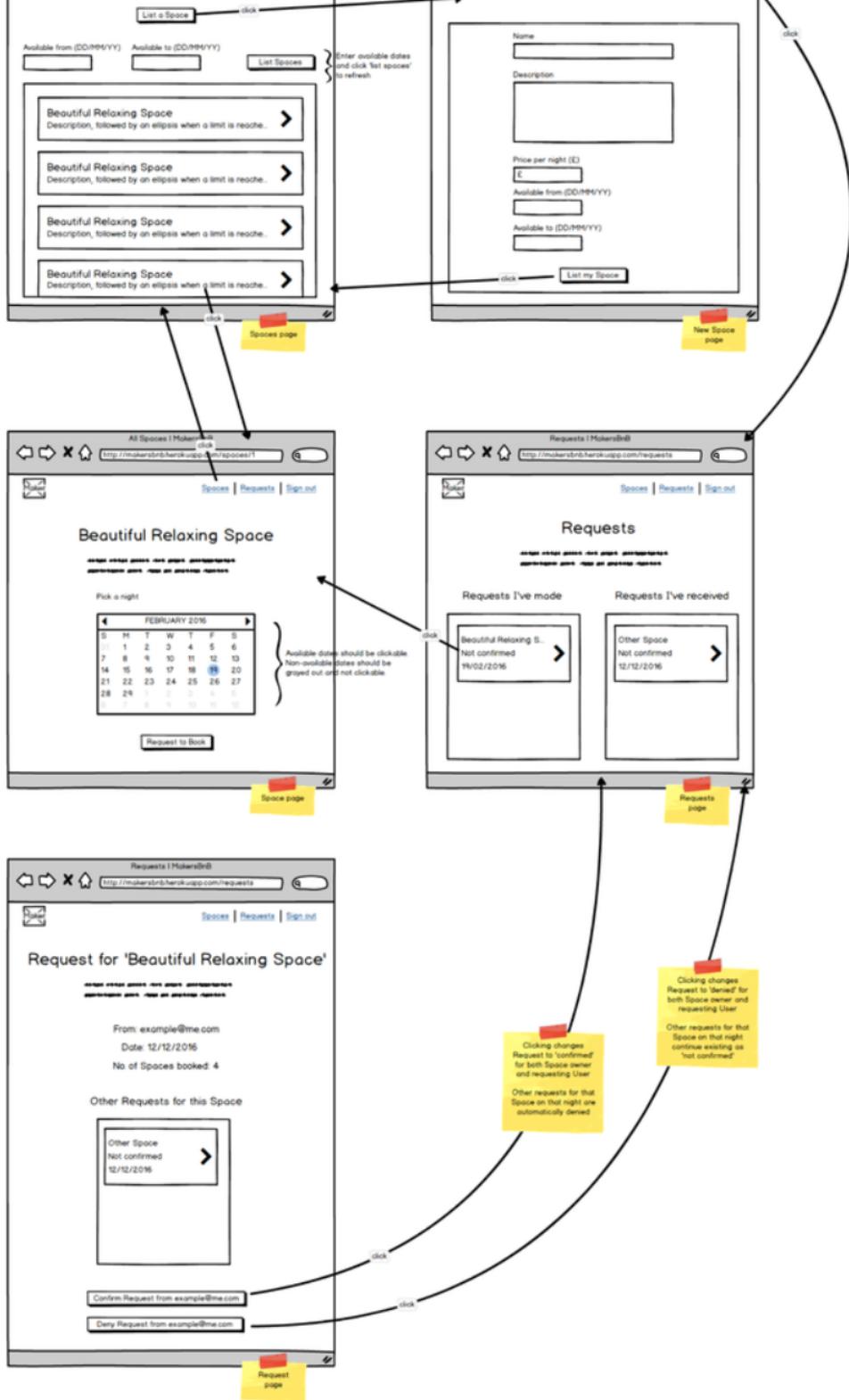
- Entry of active notes here for when manually running this test

This is the approx structure of how we could record and prepare our tests when running through all the bullet points within the 'tree of test areas' section.

## Diagram Notes:



- Further breakdown of link movement
- explanation of the header - is it the same code across pages?
- Arrows are not comprehensive
- sticky labels are sticky right? so why do they need tape?
- the sticky label names don't always match the url/
- Generally is a good diagram
- Could be coupled with a more detailed run though to reduce assumptions



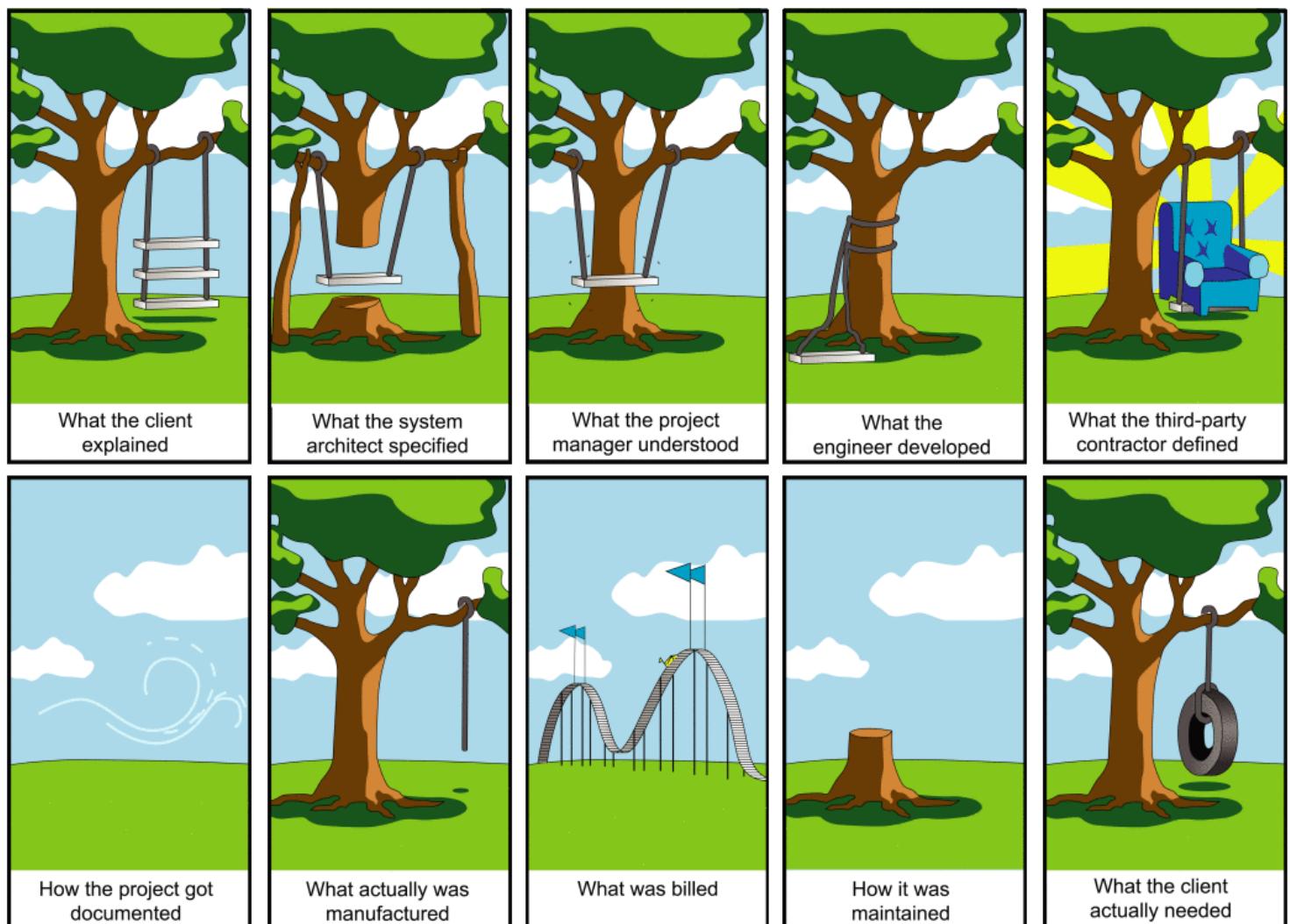
## Phase 4 More on Testing & Challenges

### Myths

- Testing is easy! Anybody can test.
- Testing is boring! You're just testing / finding bugs.
- Testers break the software.
- The best testers are the ones who find the most bugs.
- Testers are just "failed developers".

- Testers don't need to know anything about code.
- Quality Assurance: testers can "assure quality".
- If you miss a bug, you're not doing your job properly.
- Testers should "test everything".
- Testing takes too long.
- Testers and developers don't get along with each other.
- "That's not a bug, because nobody would ever do that."
- All testing can be automated.
- You can't test until the product/feature is completed.
- You should always test before your code reaches production.

## Principles of Software testing



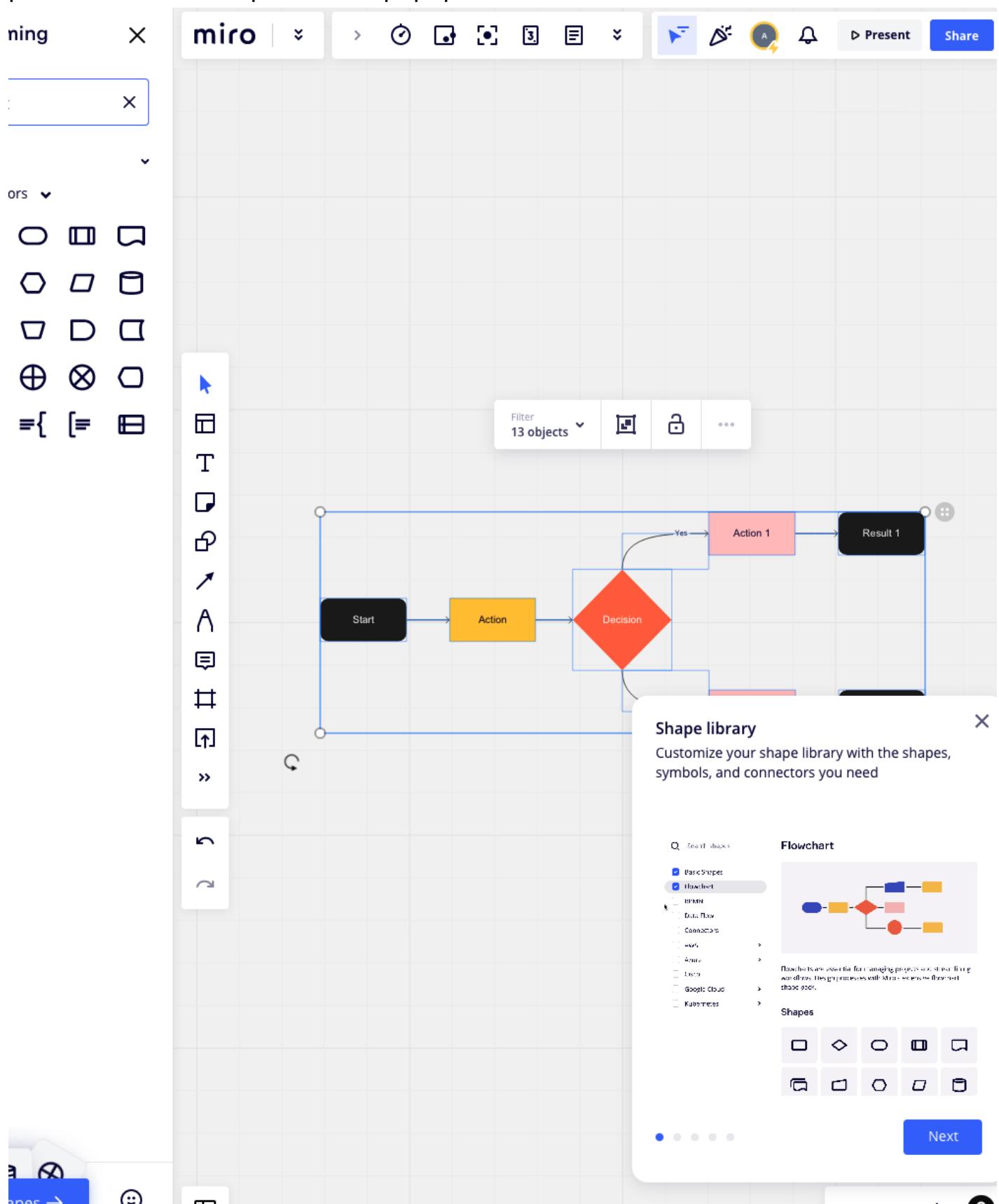
- Testing shows the presence of defects, not their absence
- Exhaustive testing is impossible
- Early testing saves time and money
- Defects cluster together
- Beware of the pesticide paradox

- Testing is context dependent
- Absence-of-errors is a fallacy

## Exercise Miro

- Is it easy to learn? Can you discover what you need to know in order to start using it?
- Can you do what you want to do with it? Is it easy to use?
- How do you feel while you're using it? What's your overall experience like?

- presented with a template and a popup tutorial



- grid, shape and such all seem relatively normal by modern program standards

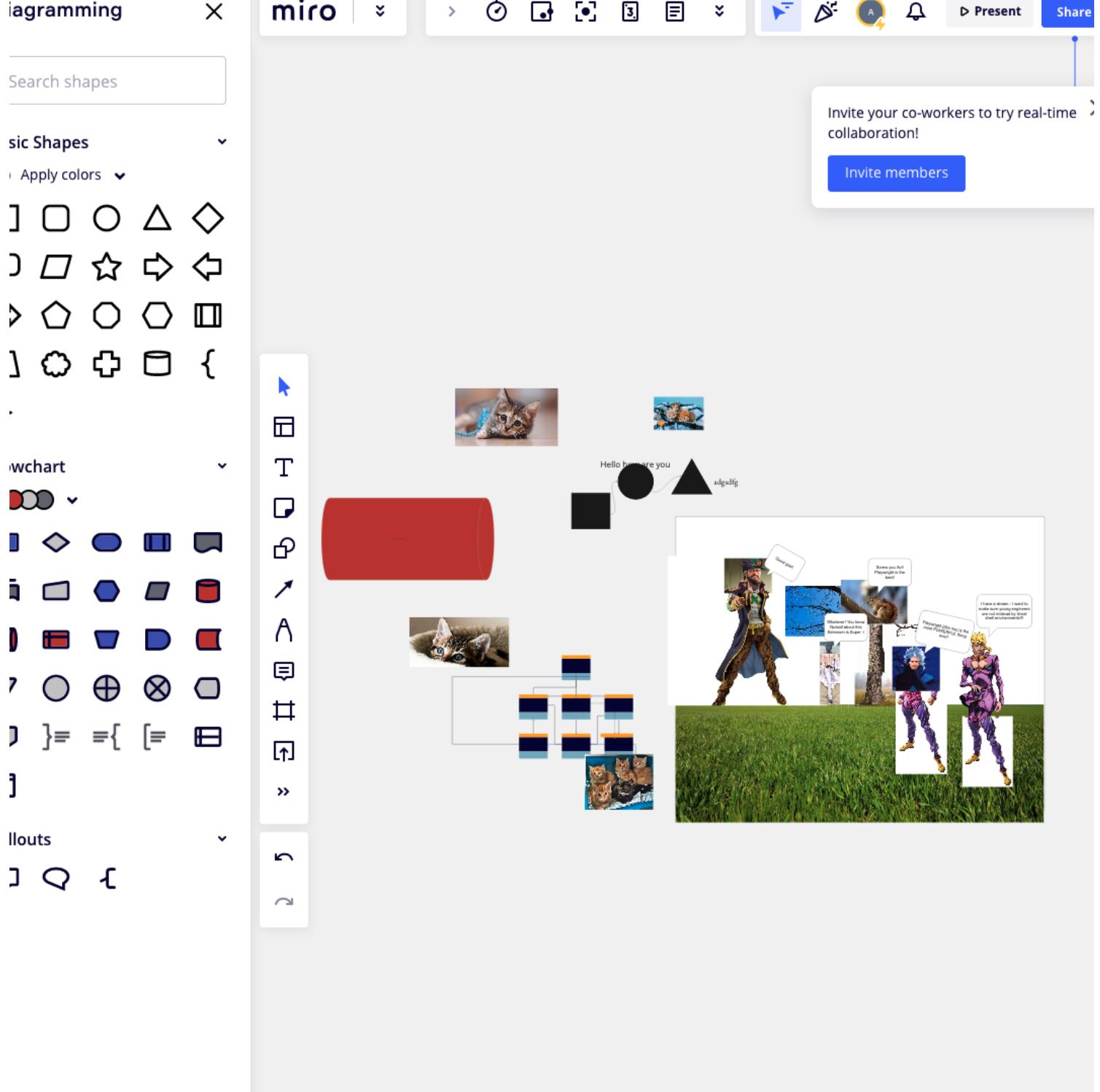
Good:

- tutorial
- template in place to give an idea of basic function

- pop up labels on everything hovered over - matching format
- icons are similar to other software so reasonably intuitive
- keyboard shortcuts are same as other programs
- connecting and moving and resizing etc are all fine
- templating is good
- collaboration and presentation modes work well
- lots of plugins and integrations
  - google
  - stickers
  - kanban
  - wireframe packs

Odd:

- if you haven't used this kind of app before you would need to learn almost all of the functions
- sometimes easy to draw connections when trying to use edge of box
- music choice for timers is not to everyone's taste



Introduction to testing - Phase 4 - Trello exploratory testing

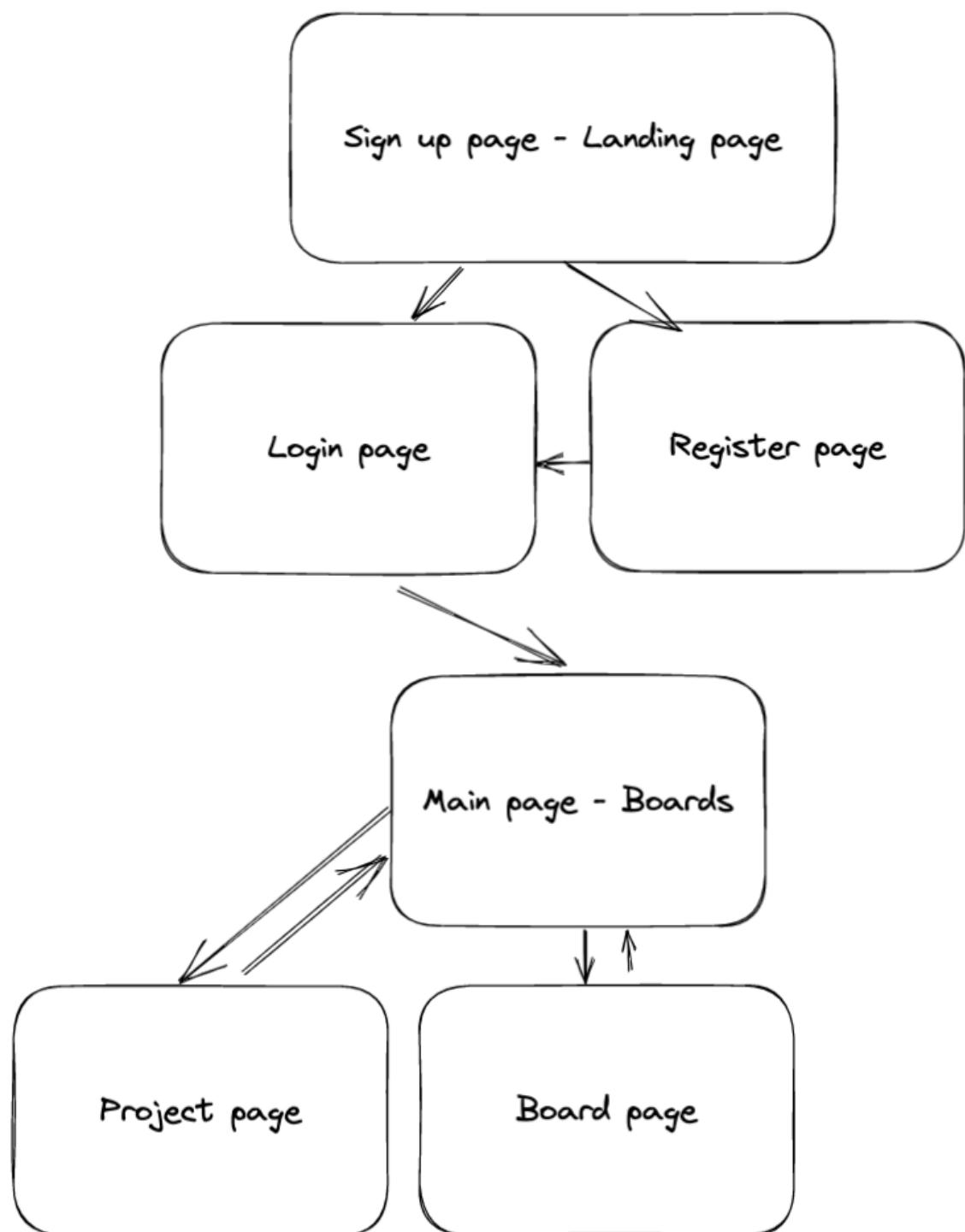
# Summary

Tasked with testing and providing feedback on Trello Clone

- made a simple plan and added to it whilst conducting exploratory notes (see below)
  - Created a simple wireframe of the pages discovered
  - listed some bugs found and created a bug report for one of them (see bottom)
    - Bug 1 - When you change the size of the browser window, the size of the board shrinks (only horizontally)

- recorded a video of whole process

## Wireframe



## Notes from exploration

Planning for testing of Trello application

## 1. What is Trello

- A sort of ticketing JIRA like board application to assign work packages to employees.

## 2. Key features of Trello

- Register and Login

JWT Authentication to connect DRF and React

Can login with username or email

- Projects (Teams)

Create Projects

Invite members to join projects via one time link

Change member access level - Admin or Normal

Admin can edit project details, invite new members, and change other members' access levels.

- Boards

Create personal boards or project boards

Recently Viewed Boards

Starred Boards

- Create and reorder lists

Create, reorder, and change list of cards

Add labels to cards

Assign members to cards

Add attachments to cards

Add comments to cards

- Search

Autocomplete (Debounced)

Unsplash API Integration

Set environment variable REACT\_APP\_UNSPLASH\_API\_ACCESS\_KEY with access key

Automatically adapt header and board title styling based on brightness of board background

- Notifications

When someone assigns you to a card

When someone comments on a card you're assigned to

When you're invited to a project

When someone makes you admin of a project

### 3. Tests

- Click all links to check the route to the right place
- Create account
- Login with valid details
- Click through the pages
- Create a project
- Create a board, populate with cards
- Test search bar for specific cards
- Move cards around the priority list, stacks
- Delete cards
- Delete a board
- Delete a project

### 4. Testing/Observations

- Sign up page (Trello)
- Login page (Login | Trello)
- Register page (Sign up | Trello)
- It did not require you to upload anything
- Unclear what it was asking for in the first place
- Main page (Boards | Trello)
- Half the buttons don't work yet and no obvious way to log out
- Bug 1 - When you change the size of the browser window the size of the board shrinks (only horizontally)
- Bug 2 - When you search it doesn't display relevant cards from boards
- Bug 4 - When you favourite a board the recently viewed section is overridden by the starred section
- Project page (Project name | Trello)
- No way to make a board within a project
- The admin can remove admin privileges from themselves and get trapped in a project
- Board page (Board name | Trello)
- Able to replicate the re-ordering bug with lists (Refreshing page resets itself)
- Bug 3 - When you click on a card to view and edit the popupbox is too large when working in a smaller browser window and spills off the edges.
- Three dots doesn't correspond to list settings and only allows reordering of the list.

# Bug report

## Trello - Visual issue, displaying boards autosizing not working

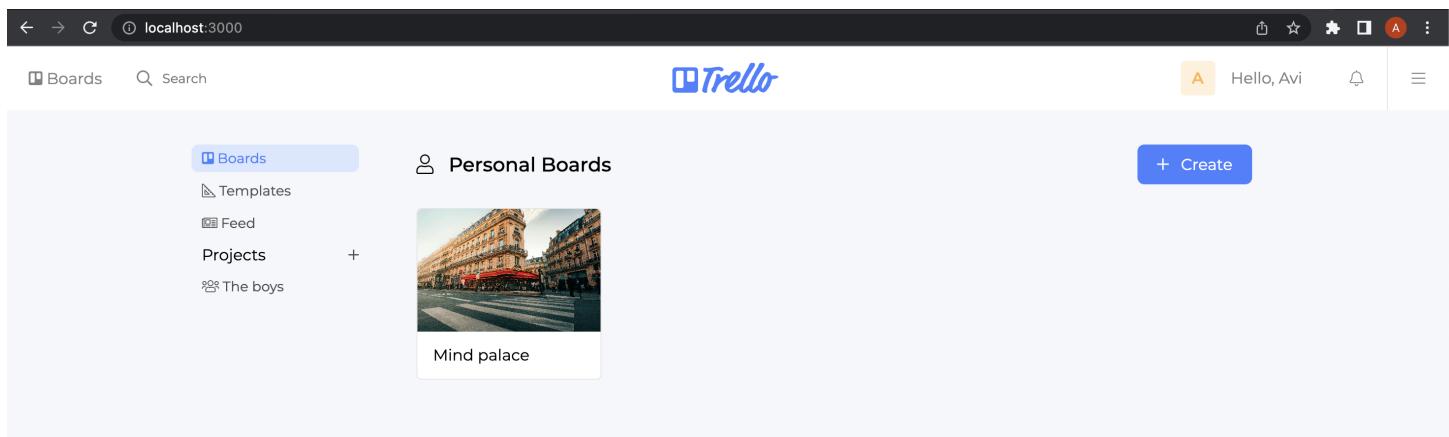
### Description

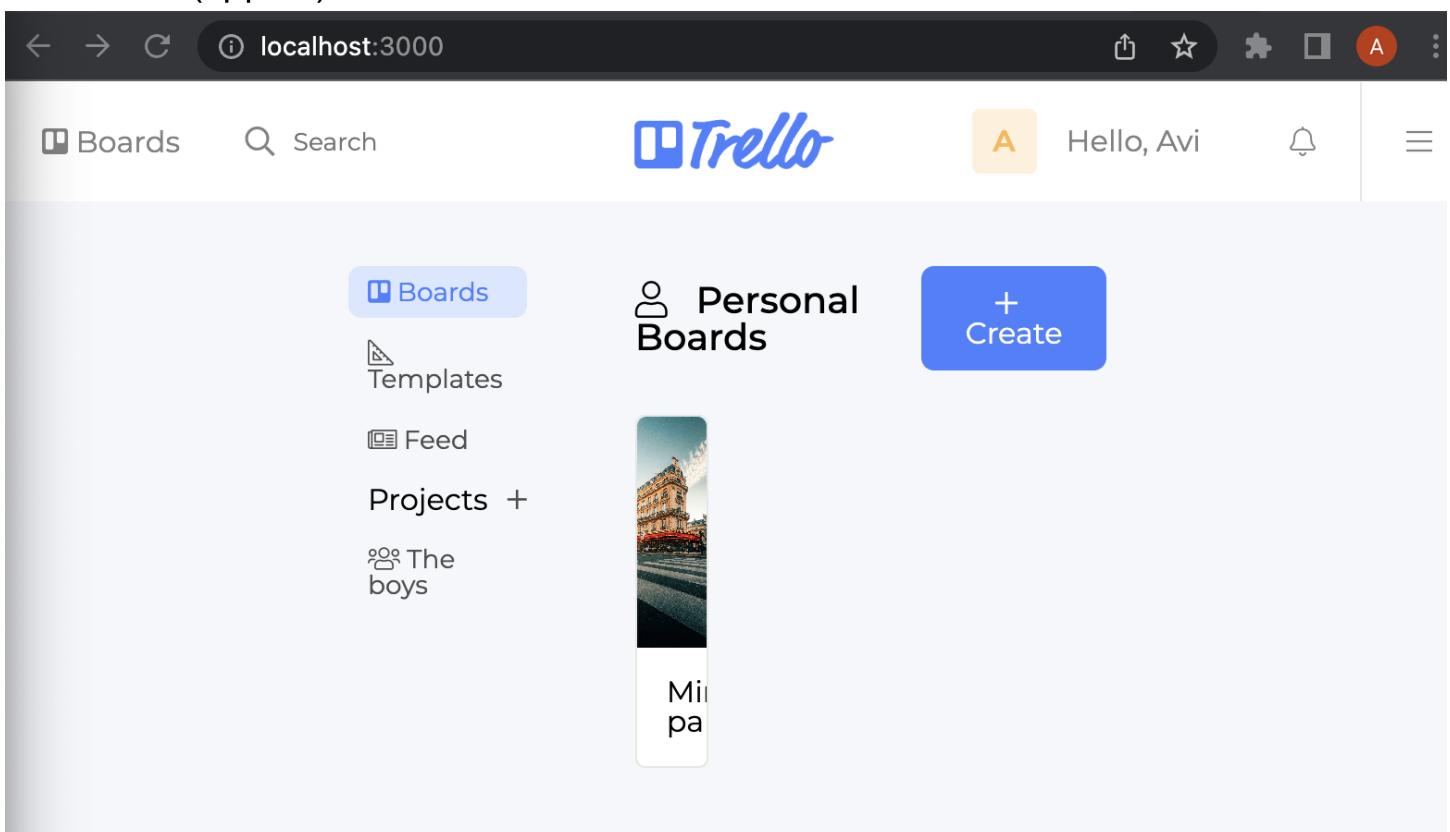
When viewing the 'main page - boards' the thumbnails that display existing boards only shows correctly when the browser is big enough to do so. When you reduce the size of the browser horizontally, it proportionately 'squashes' the thumbnail in a way that makes it hard to view. This does not happen vertically. This behaviour was unexpected, rather than the thumbnails would reposition. This is important as it will affect the user experience negatively and also can make the thumbnails as unreadable.

### Steps to reproduce

1. signed up with valid details
2. logged in with the details
3. created a board
4. resized the browser window horizontally

Browser at full width on Macbook Air





## Severity

**Medium** - Directly affects the user experience and usability of the application.

## Priority

**High** - As the problem is likely to happen to users (depending on their browser preferences) and that this could influence using the application at all

## Different Approaches to Quality Engineering

**Best practice** - no such thing

**ISTQB and context driven testing**

- international software testing qualifications board
- BBST black box software testing
- BCS british computer society
- and lots of other stuff

**Organisational approaches to testing**

- different company = diff software, ethos, approach, etc

## Community

- there are support groups for testers
- in person and otherwise

## Functional and non-functional

From before:

- Functional testing - literally checking that each thing works
- Non-functional Testing - you usually start with functional then move to this. You might check the response to the user or the speed of the app

### functional

Functional testing will look at the correctness or appropriateness, and the behaviours of "what" the thing being tested does.

### Non-functional

While functional testing looks at the "what", non-functional looks at "how well" the thing does it.

- Security
- Performance
- Load
- Stress
- Usability
- Maintainability
- Installability

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Which of the two categories above do you think each of these falls under or relates to?

- Unit testing / test-driven development
  - functional - the what of the thing
  - because the user story leads to the actual program
  - can be non functional when looking at certain aspects like if the wrong input is entered does it throw a complaint? not NEEDED maybe - but makes it better
- Proofreading an application's accompanying Help details or manual
  - non-functional - this is all about the 'how'
- Availability testing

- at its core it is functional testing - does the thing work
  - but also when it comes to crash and the durability - the longer it lasts with a low bug limit - this shows how it may be better than a higher limit
  - Exploratory testing
    - Both - definitely again - usually we have focused on the main functions - but it also completely overlaps with how well it does those
- 

## Quality and Testing

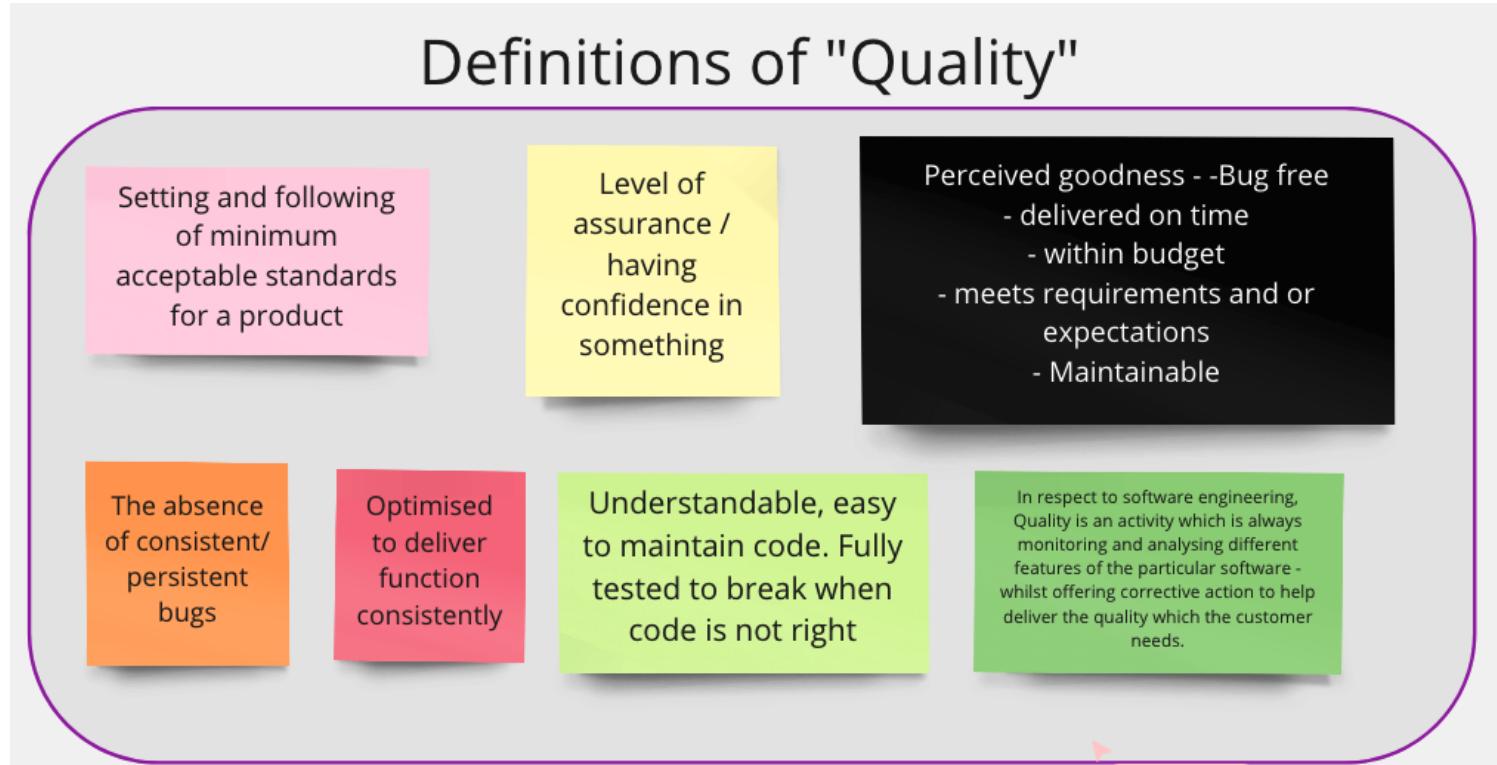
To be run through by coaches

### quality

You're towards the end of this week and "quality" has been mentioned a few times by now, including in coaching sessions, group discussions and various bits of work.

But... what is quality? What's your definition or explanation, if someone were now to ask you what it was?

### Definitions of "Quality"



### testing

Similarly, "testing" has not only been mentioned a lot but you've been doing a lot of testing too!

So, what is testing? What would you say to someone who asked what software testing was, or why it was important in software development?

Finally, what's the relationship or association between "testing" and "quality"? What's your opinion on it now you are towards the end of the week?

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## Final Exercise

### ThingsBoard

ThingsBoard is described as an open-source IoT (Internet of Things) platform providing dashboards for data visualisation, among other things.

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## Final Exercise

### Introduction to testing - final exercise

### Exploratory testing description

Tasked with testing part of the 'ThingsBoard cloud platform' website.

We have decided to focus on one dashboard 'fleet tracking'.

We will go through the testing tree and identify areas of focus, complete test cases bug reports and state our assumptions, perceived risks etc.

### Testing Tree

Note: Testing starts from after fleet tracking installation - when presented with the dashboard front/starting page:

The screenshot shows the ThingsBoard Cloud Platform interface. The top navigation bar includes 'thingsboard.cloud' URL, 'Dashboard groups > Fleet tracking > Fleet tracking', 'Current subscription: ThingsBoard Cloud Maker (Trial ends on the Feb 12, 2023)', and a user profile for 'avi patel Tenant administrator'. The left sidebar is titled 'Fleet tracking' and contains the following items:

- Integrations
- Roles
- Customers hierarchy
- User groups
- Customer groups
- Asset groups
- Device groups
- Profiles
- Entity view groups
- Edge groups
- Edge management
- Widgets Library
- Dashboard groups (expanded)
  - All
  - Fleet tracking
- OTA updates
- Scheduler

The main content area is titled 'Fleet tracking' and displays three sections:

- Buses:** A table showing bus details:
 

Bus name	Status	Speed	Fuel level
Bus A	On route	50.4 MPH	32 %
Bus B	On route	26.8 MPH	34 %
Bus C	Broken	0 MPH	55 %
Bus D	Refueling	0 MPH	0 %
- Bus tracking events:** A table showing tracking events for Bus B and Bus C:
 

Time	Bus name	Severity	Type	Message	Status
2023-01-13 10:56:04	Bus B	Critical	Speed limit	Bus has crossed speed limit!	Cleared Unacknowledged
2023-01-13 10:56:03	Bus B	Critical	Speed limit	Bus has crossed speed limit!	Cleared Unacknowledged
2023-01-13			Speed	Bus has	Cleared
- Map View:** A map of San Francisco showing the locations of the four buses. Each bus is marked with a pin and a callout box displaying its name, status, and current speed.

- We are also not planning to test the general website - just the dashboard.

## Main Areas to test and what to test in those areas

- 'Buses' metric (seen top left in screen above)
  - perceived role - to display the details of a specific bus after being clicked on - for this new page to be intractable
- 'Bus tracking events' metric (seen bottom left in screen above)
- 'Map View' metric (seen right in screen above)

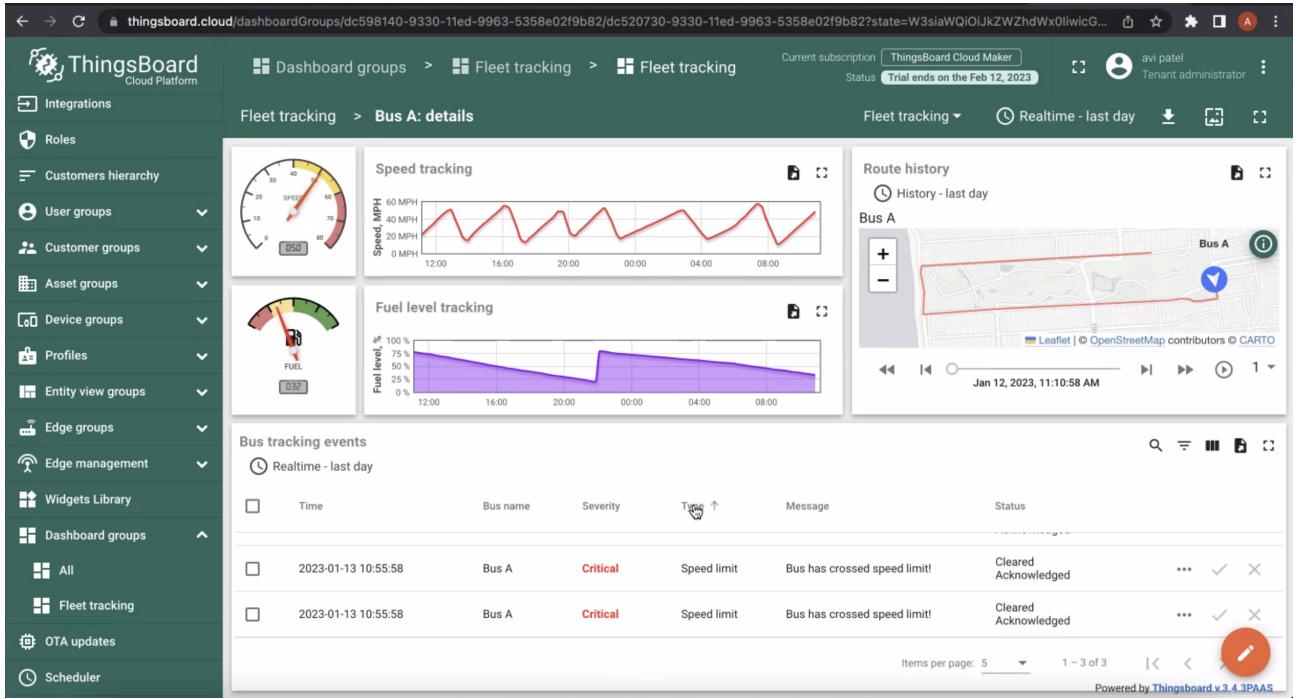
## Example test cases with notes from exploration

### Test purpose

To test the use of the 'buses' metric as a general first time user might click through.

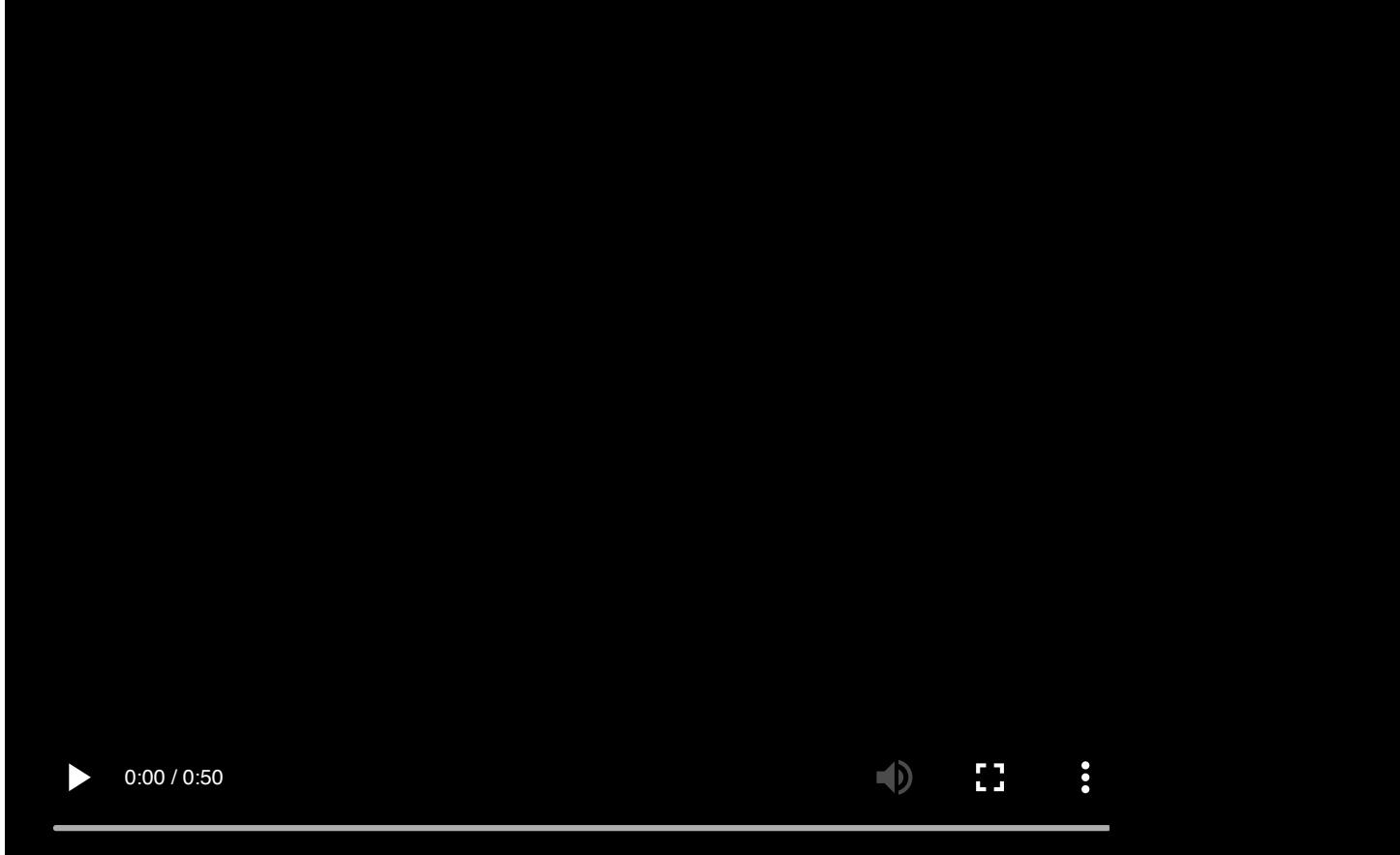
### Steps

- from start page above click on Bus A
- We are presented with the Bus A: Details page

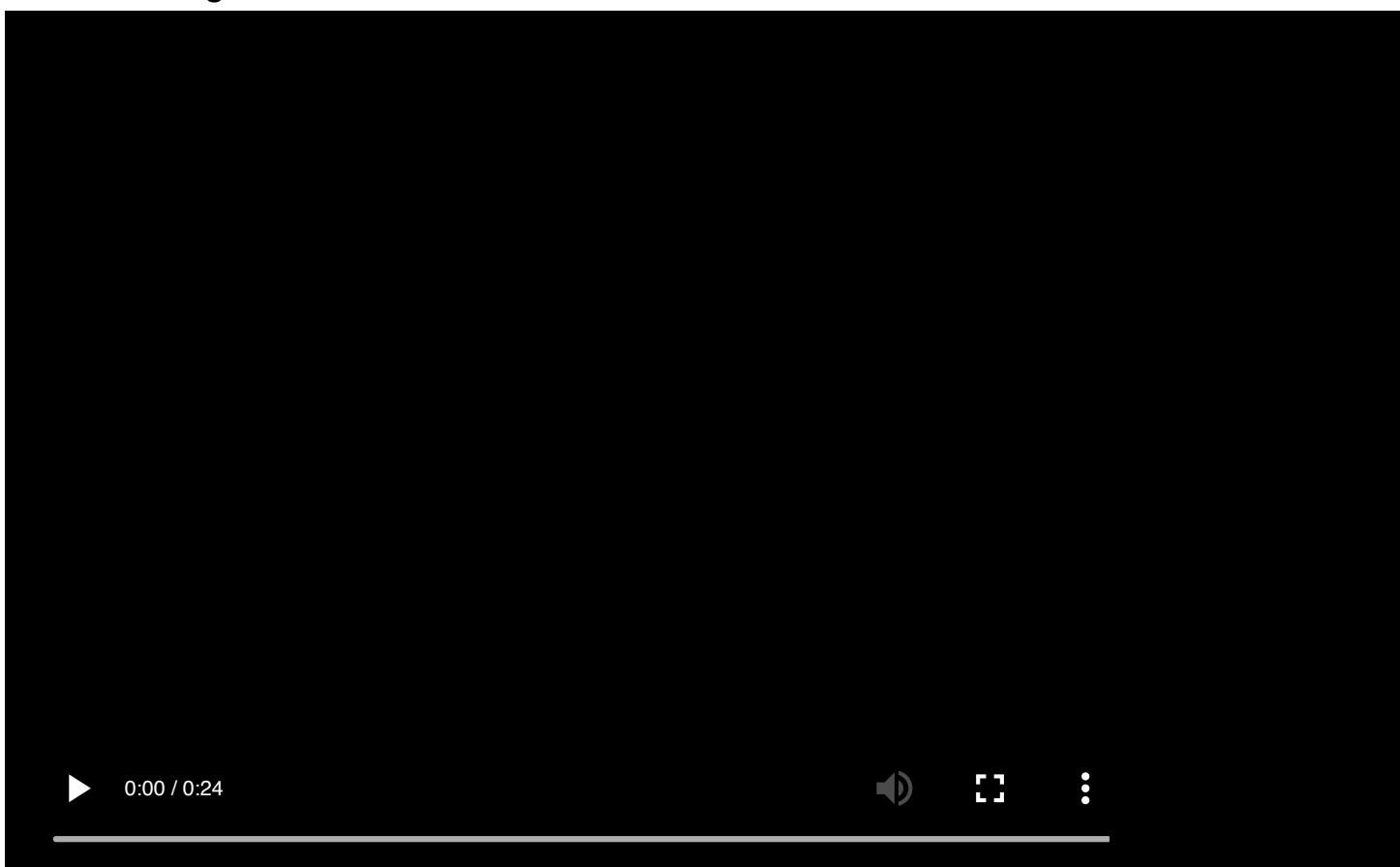


- Clicked through 'bus tracking events' section - all filters and buttons appear to work
  - search works
  - filters work
  - '...' buttons to the right of the 'events' shows further details
- the 'Route history' section of this
  - and - work
  - scroll works
  - 'i' button toggles further information, but does not scale to page size necessarily
  - the 'skip' and fast-forward buttons appear to be the wrong way round
  - play button is very, very slow and can only scale up to 25x
  - the route history playing has not linked with the other metrics on this page
- speed tracking
  - the speed graph when at 0 shows -1mph
- fuel level tracking
  - the graph when the bus has 100% shows up to 150%, this is not possible
- Live speed and fuel gagues are

Example usage:



Video of usage



## Main unexpected functionality

- the fast-forward button and skip buttons do not seem to function correctly
- the graph when the bus has 100% shows up to 150%, this is not possible

- the speed graph when at 0 shows -1mph

## Test purpose

To test intractability on the 'main page'

## Steps

- zooming map is fine
- filtering works here - you can actually filter so that nothing shows - i.e. unchecking all the boxes
- Clicked on the buttons and filters in the bus tracking events and buses metrics on this page

## Main unexpected functionality

- filtering seems to not show selected filter
  - this does work when you have selected a specific bus however
- Report viewing / analytical view is not clear
- not particularly user-friendly - no tutorial or guide popups
- data displayed was sometimes unclear

## Bug report examples

# Description

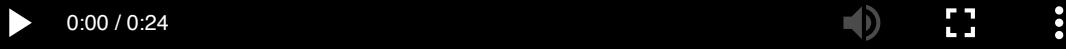
When viewing the dashboard/front page and adjusting the filters - it does not appear to change any of the content

## Steps to reproduce

1. navigate to the starting page

The screenshot shows the ThingsBoard Cloud Platform interface. The left sidebar contains navigation links for Integrations, Roles, Customers hierarchy, User groups, Customer groups, Asset groups, Device groups, Profiles, Entity view groups, Edge groups, Edge management, Widgets Library, Dashboard groups (with sub-options All and Fleet tracking selected), OTA updates, and Scheduler. The main content area is titled 'Fleet tracking' and displays two sections: 'Buses' and 'Bus tracking events'. The 'Buses' section lists four buses: Bus A (On route, 50.4 MPH, 32% fuel), Bus B (On route, 26.8 MPH, 34% fuel), Bus C (Broken, 0 MPH, 55% fuel), and Bus D (Status: Refueling, Speed: 0 MPH). The 'Bus tracking events' section shows three entries for Bus B: a speed limit violation at 2023-01-13 10:56:04, another at 10:56:03, and a Soeed entry. To the right is a map of San Francisco with icons for each bus. A legend indicates green for On route, red for Broken, and blue for Refueling.

2. Click on the filter 'real-time - last X days'
3. Adjust that filter
4. Notice none of the metrics change



Expectations are that adjusting this would have some effect on the data displayed

Speculation is that being in a different time-zone might have some effect on this

## Severity

Medium - it does not break anything - however it is a function that appears to not be doing anything at the moment

## Priority

Low - this is not breaking the application, but would be better if improved upon.

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## Description 2

When viewing the bus details on the bus details page(s). The analytics sometimes show unrealistic data:

- the graph when the bus has 100% shows up to 150%, this is not possible
- the speed graph when at 0 shows -1mph

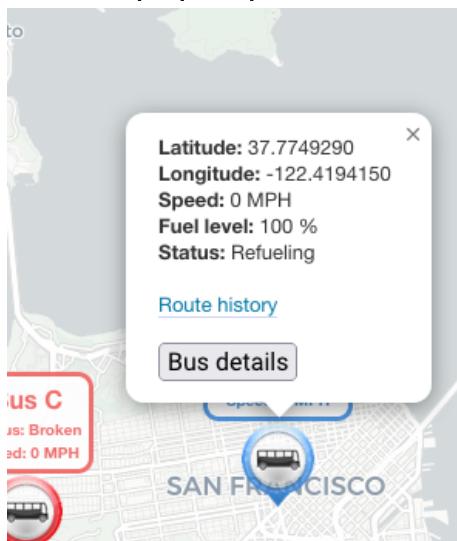
This is not good as it is clearly not possible, this will likely lead to the customer not placing trust in the application for its accuracy.

# Steps to reproduce

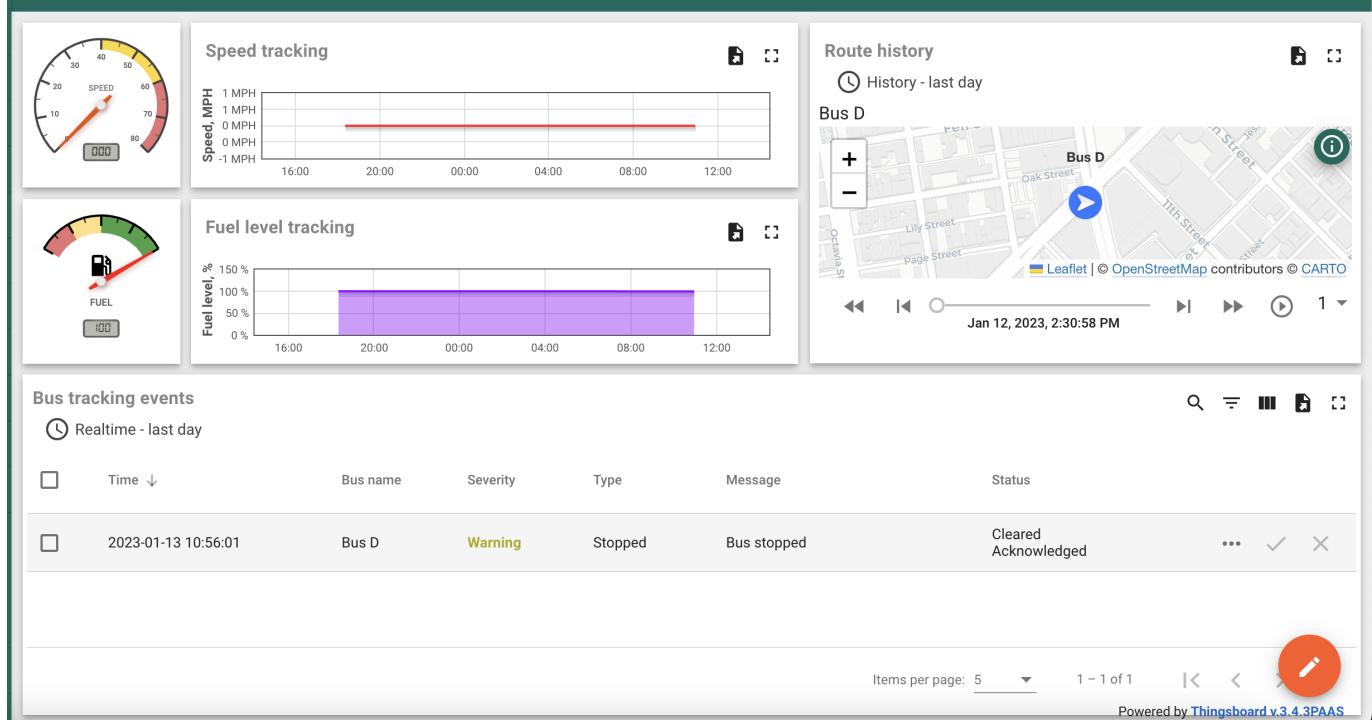
## 1. navigate to the starting page

The screenshot shows the ThingsBoard Cloud Platform interface. On the left, there's a sidebar with various management options like Integrations, Roles, and Customer groups. The main area is titled 'Fleet tracking' and displays a map of San Francisco with four bus icons. Each bus has a callout box showing its status: Bus A (On route, 50.4 MPH), Bus B (On route, 26.8 MPH), Bus C (Broken, 0 MPH), and Bus D (Status: Refueling, Speed: 0 MPH). Below the map is a table titled 'Buses' with columns for Bus name, Status, Speed, and Fuel level. It lists Bus A, Bus B, Bus C, and Bus D. There are also sections for 'Bus tracking events' and 'Realtime - last day'.

## 2. Click on Bus D on the map and then click on 'Bus details' when it pops up



## 3. The display under 'Speed tracking' and 'Fuel level tracking' show impossible information



Expectations are that 150% is not possible and that 100% should be the maximum

And that the speed can only go as low as 0 not down to -1

## Severity

Low - the data is likely still accurate - it is just that it looks not quite as good as it should

## Priority

Low - this is not breaking the application, but would be better if improved upon.

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## Risks

- Some data seemed inconsistent - risk is that this leaves the customer unclear of the accuracy of the tool
- Way to track property - security is a concern
- maybe also a safety risk as a result

## Assumptions

- That we have limited time and resource to test much functionality

- the dashboard time stamps in various sections seem to be a bit hit and miss - some of which seem to line up with when we installed the board. Since this is a demo dashboard for showcasing the functionality - we are assuming that these time stamps would function correctly when used by a customer.
- That this is an accurate representation of real use
- that the user can get to the starting point highlighted above

## Questions

Stating who for

- For the 'seller of this tool'
  - Who is it aimed at
  - what onboarding do you offer
  - purchasing options
  - How much needs to be set up by the customer?
  - how often is the platform updated? etc
- If there is some functionality that is not representative of real use - should this be highlighted as such more clearly?

## Diagram

### Dashboards/front starting page

The screenshot shows a fleet tracking dashboard interface. At the top, a navigation bar indicates the path: Dashboard groups > Fleet tracking > Fleet tracking. It also shows current subscription details (ThingsBoard Cloud Maker, Trial ends on Feb 12, 2023), the user (avi patel, Tenant administrator), and a download link. Below the navigation is a title bar for 'Fleet tracking' with a dropdown for 'Realtime - last 30 days'.

The main area is divided into two sections. On the left is a table titled 'Buses' showing four entries:

Bus name	Status	Speed	Fuel level
Bus A	On route	50.4 MPH	32 %
Bus B	On route	26.8 MPH	34 %
Bus C	Broken	0 MPH	55 %

Below this is another table titled 'Bus tracking events' showing three recent events for Bus B:

Time	Bus name	Severity	Type	Message	Status
2023-01-13 10:56:04	Bus B	Critical	Speed limit	Bus has crossed speed limit!	Cleared Unacknowledged ***
2023-01-13 10:56:03	Bus B	Critical	Speed limit	Bus has crossed speed limit!	Cleared Unacknowledged ***
2023-01-13	-	-	Speed	Bus has	Cleared

To the right is a map of San Francisco and Sausalito. Four buses are tracked: Bus A (red dot, status: Broken, speed: 0 MPH), Bus B (green dot, status: On route, speed: 27 MPH), Bus C (green dot, status: On route, speed: 27 MPH), and Bus D (blue dot, status: Refueling, speed: 0 MPH). A callout line points from the 'Bus C' entry in the table to its location on the map.

At the bottom of the dashboard, there are footer links: Leaflet, OpenStreetMap contributors, CARTO, Powered by Thingsboard v.3.4.3PAAS.

