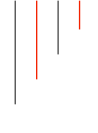


SWE 265P

Reverse Engineering and Modeling

Lecture 10

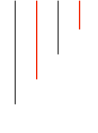
Duplication of course material for any purpose without the explicit written permission of the professor is prohibited.



“Who the f wrote this” – Jonathan Boccara [Author “The Legacy Programmer’s Toolbox”]***



“Before you rewrite a piece of code, make sure you understand how it got to its current state. Understanding the history is important for avoiding repeating the same mistakes.” – Owen O’Malley [Founder and technical fellow, Cloudera]



“I look for the original developer if I have access to that person.” – Leyna Cotran [Staff systems engineer, Lyft]

Today

- Last week's material
- Key expert practices
- Miscellaneous
 - advanced important topics
 - attitude
 - enduring principles
- Final
- Wrap-up

Last week's material

- Key expert practices
 - play the fool
 - are alert to evidence that challenges their theory
 - adjust to the degree of uncertainty present
- Testing as a mechanism for code understanding
 - reading
 - running
 - writing
- Any questions?

Last week's homework – pull request

- What change does your pull request contain?
- How difficult is it to implement the pull request?
- Did you submit it yet and, if so, did you get a response from the maintainers?
- What did you learn about your system?
- Any questions?

Last week's homework – old test cases

- How difficult was it to find three existing, interesting test cases for your system?
- What approach(es) did you use to do so?
- What did you learn about your system?
- Any questions?

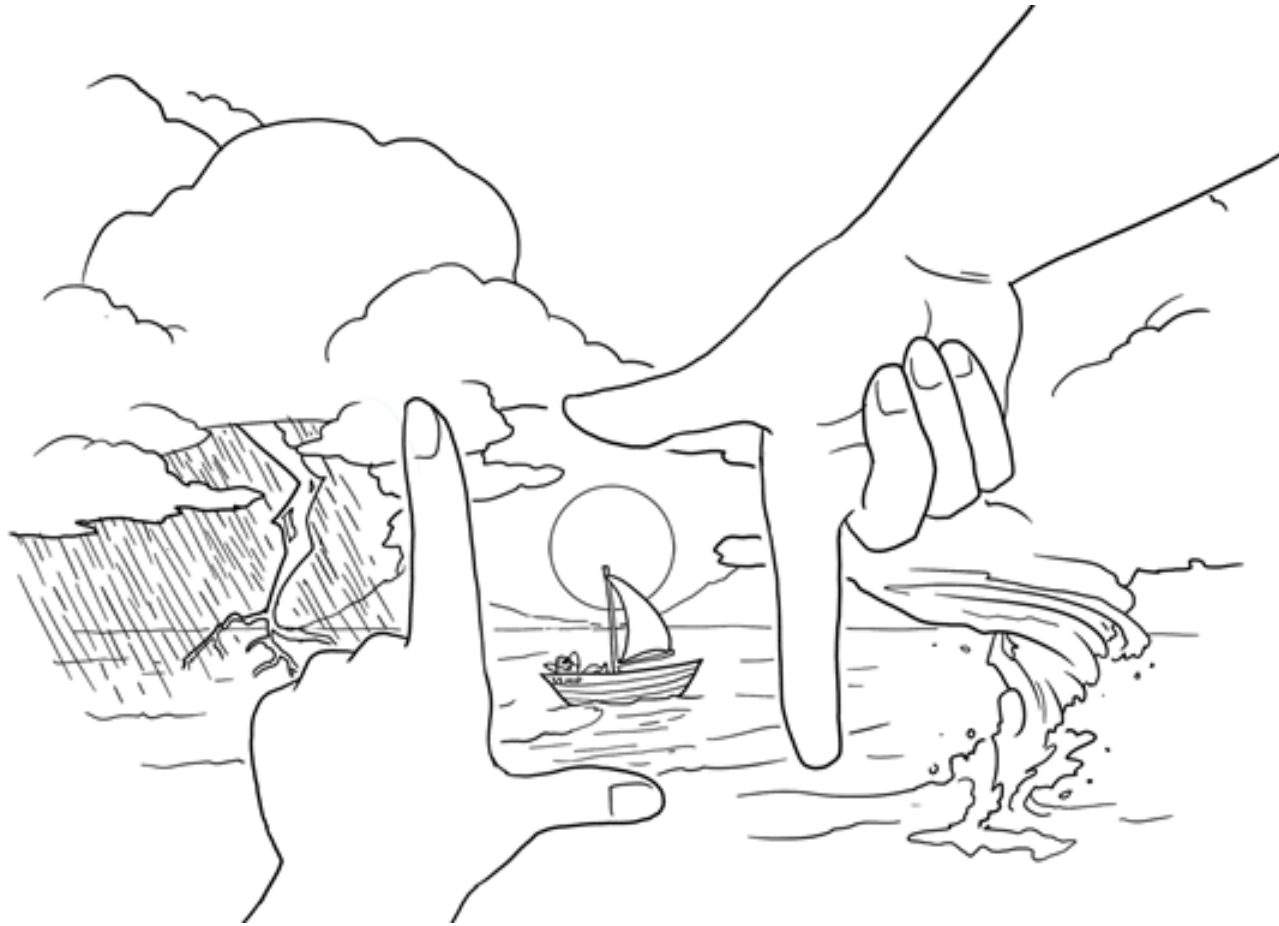
Last week's homework – new test cases

- How difficult was it to develop three new test cases for your system?
- What approach(es) did you use to do so?
- What did you learn about your system?
- Any questions?

KEP #19: know when to stop



KEP #20: reassess the landscape



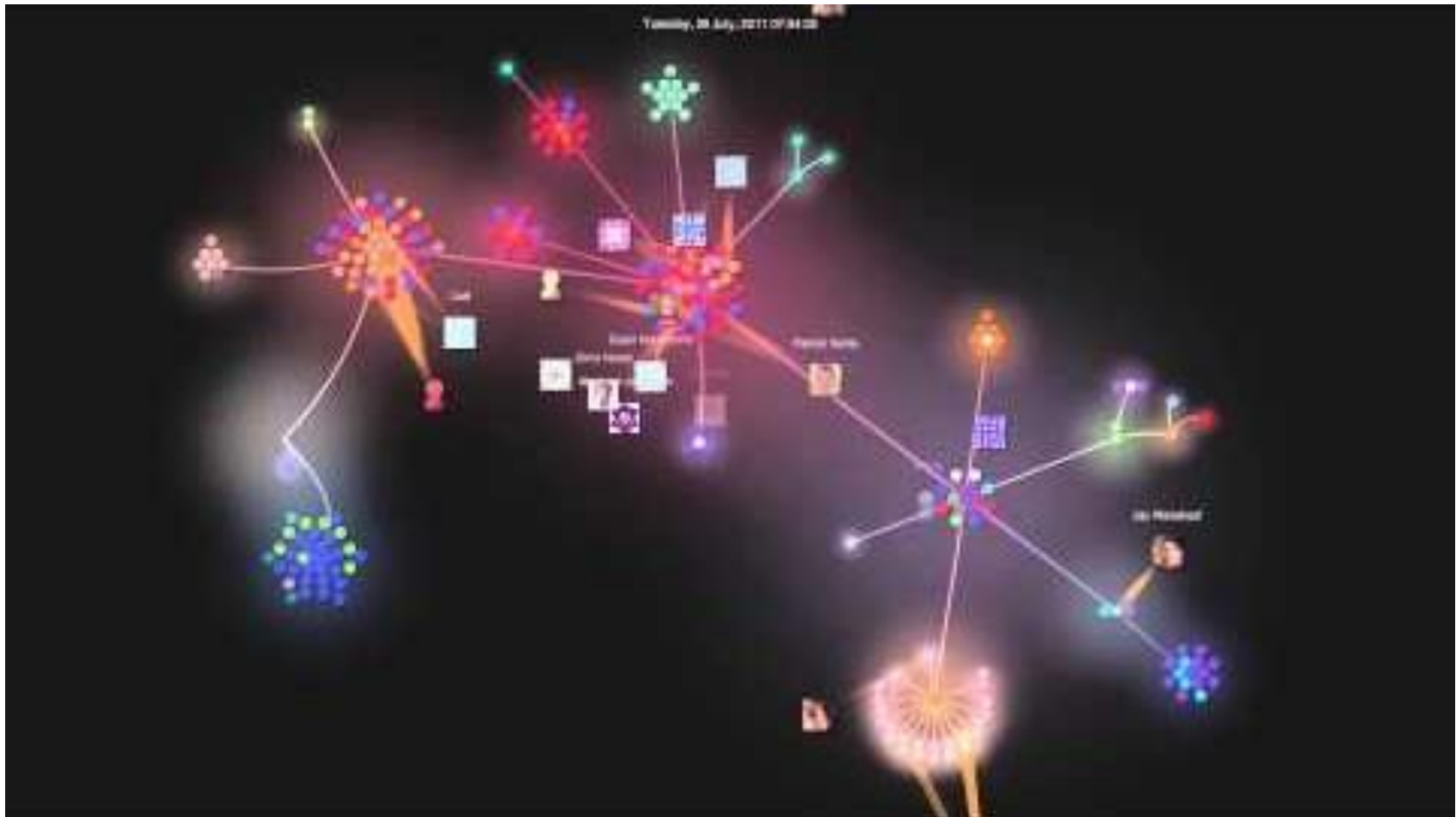
KEP #21: keep learning



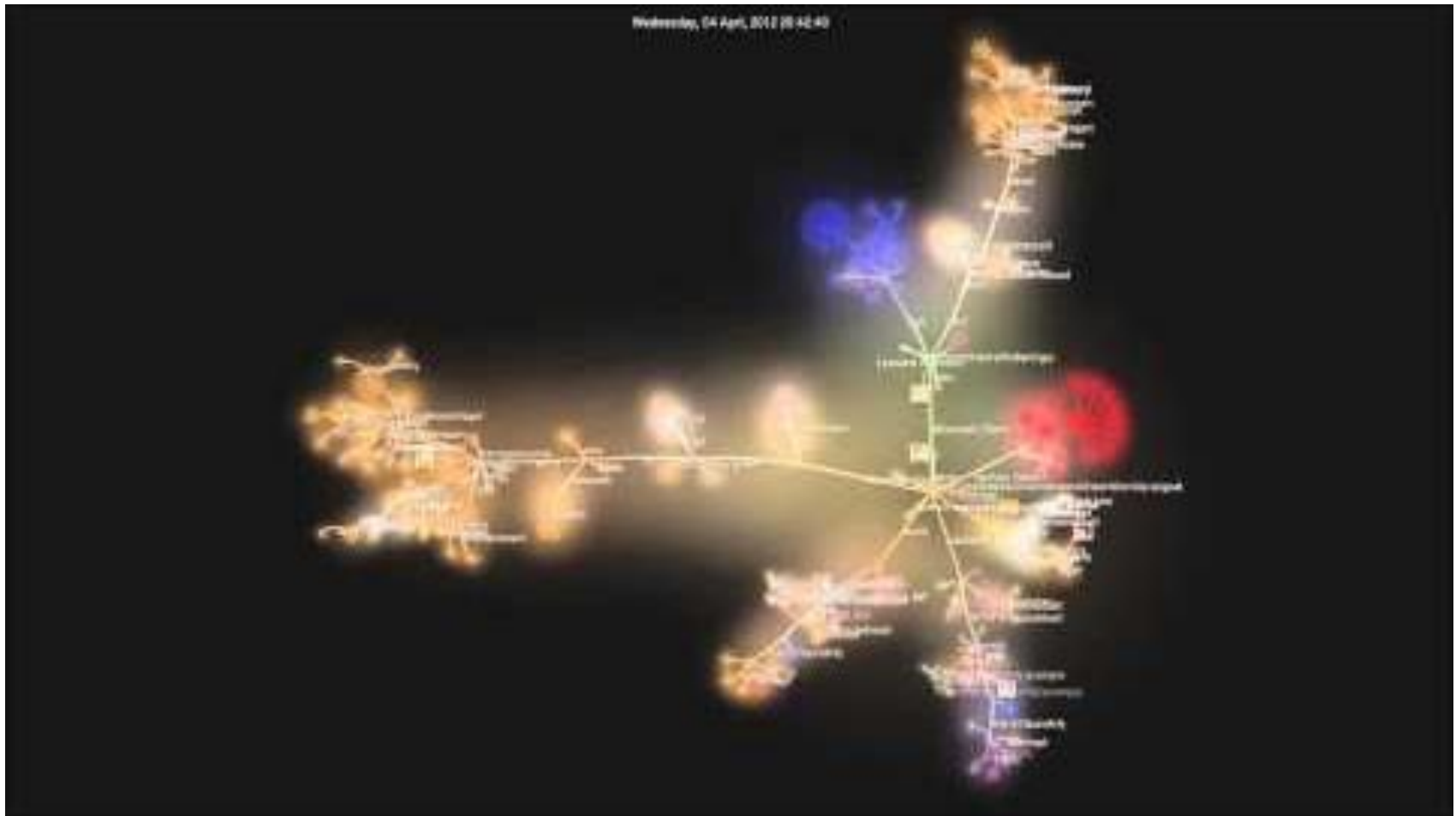
Miscellaneous

- Advanced topics
- Attitude
- Enduring principles

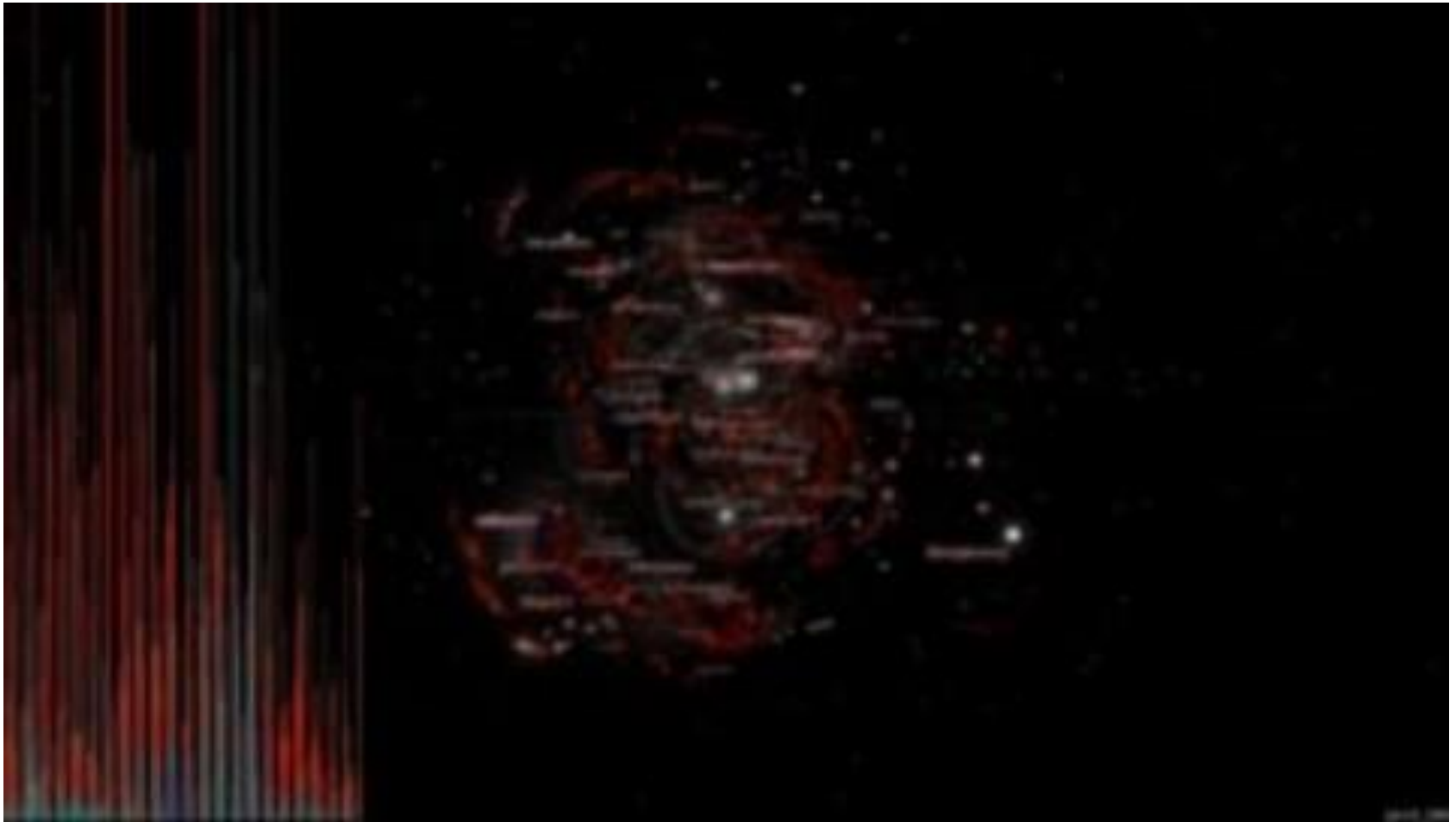
Advanced topic #1: history



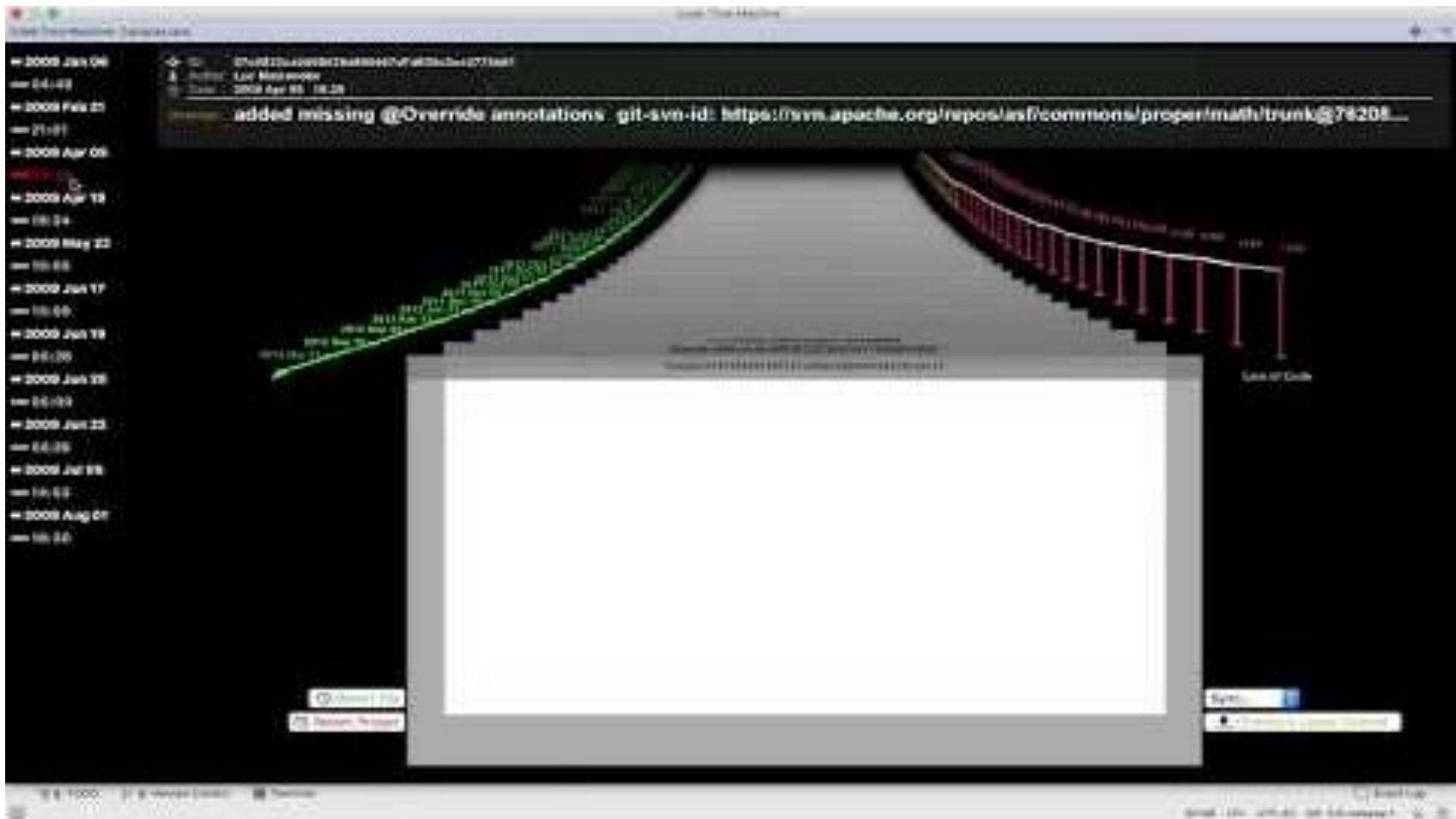
Advanced topic #1: history



Advanced topic #1: history



Advanced topic #1: history



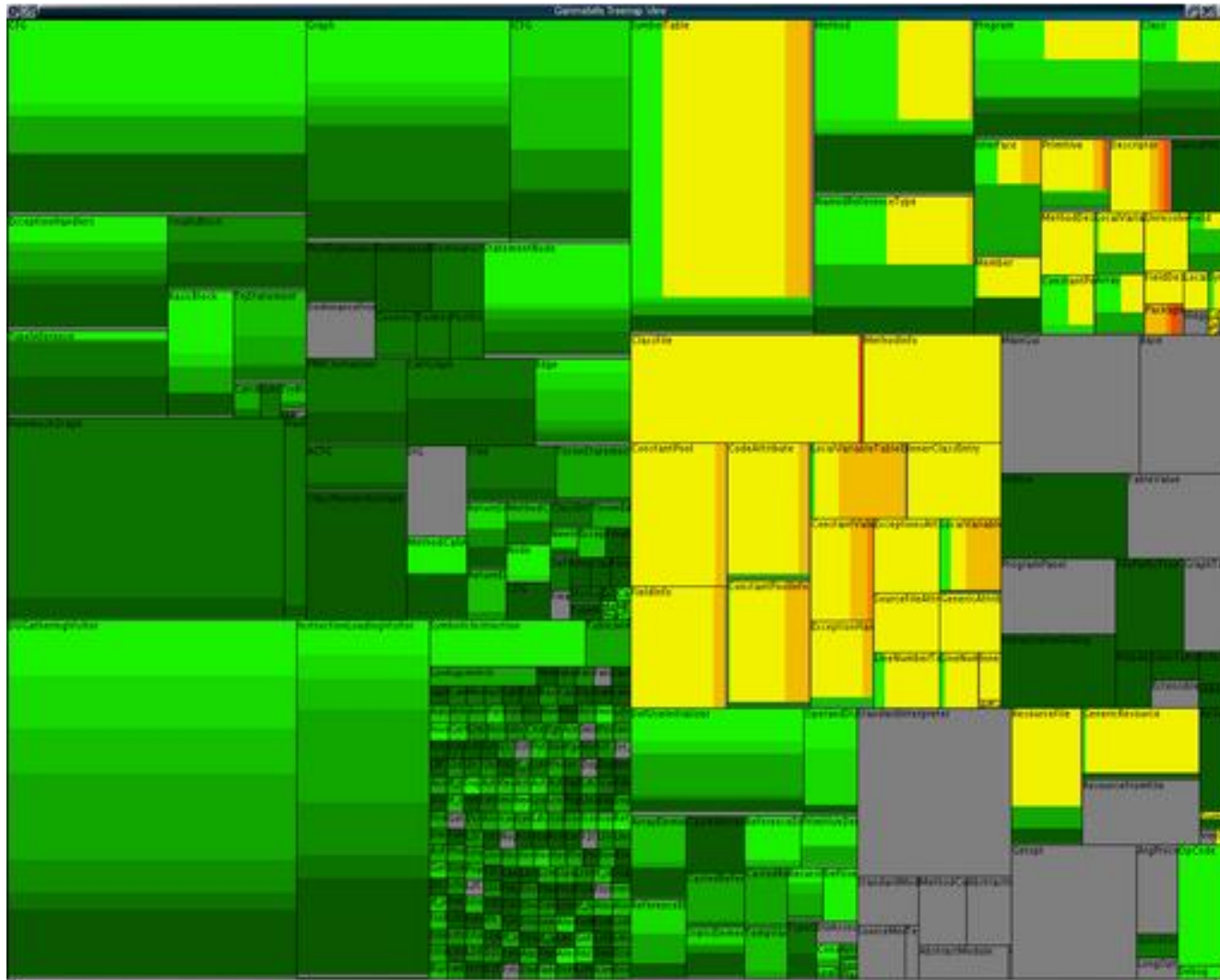
Advanced topic #1: history

```
sweetmeat -- less -- 137x38
bash less
[ sweetmeat ] [ 09:29:42 ]
git log --graph --pretty=format:'%Cred%h%Creset -%C(yellow)%d%Creset %s %Cgreen(%cr) %C(bold blue)<An>%Creset' --abbrev-commit --date=relative
* 8fd8267 - (HEAD, source) Initial source commit (6 weeks ago) <Chris>
* 9cf6b5f - (octopress/master, octopress/HEAD) Merge pull request #1300 from daphotron/master (8 weeks ago) <Parker Moore>
| \
| * 9627982 - Remove redundant reset-html5, global-reset already calls reset-html5 (8 weeks ago) <Daphne Liro>
| /
* 2432f99 - Merge pull request #1297 from ndbroadbent/patch-1 (9 weeks ago) <Brandon Mathis>
| \
| * 7a4feb1 - Fix http generated images path when using Compass sprites (9 weeks ago) <Nathan Broadbent>
* | d85c241 - Merge pull request #1298 from imathis/deprecate-192-whoops (9 weeks ago) <Parker Moore>
| \ \
| | /
| | /
| | /
| * bd2caad - Deprecate 1.9.2, add 2.0.0 :) (9 weeks ago) <Parker Moore>
| /
* 64bb9a3 - Merge pull request #1141 from joelclermont/patch-1 (9 weeks ago) <Brandon Mathis>
| \
| * 1a1c868 - Enable inline PHP syntax highlighting (6 months ago) <Joel Clermont>
* | b8a981d - Merge pull request #1291 from stevenharman/patch-1 (2 months ago) <Parker Moore>
| \ \
| | /
| | /
| * | 7b52209 - Use HTTPS for Rubygems (2 months ago) <Steven Harman>
| / \
* | d b d f 6 4 e - updated Sass to 3.2 (2 months ago) <Brandon Mathis>
* | 1 b c f e 8 4 - Merge pull request #1286 from SamWhited/master (3 months ago) <Parker Moore>
| \ \
| * | 0 9 7 8 9 7 7 - Fix second Twitter URL to be protocol relative (3 months ago) <Sam Whited>
| * | 2 7 d c f a 1 - Use protocol relative URL for Twitter (3 months ago) <Sam Whited>
| / \
* | b c 6 7 4 7 5 - Github Pages deployment is now using `git add -A` for compatability with Git 1.8.2+ (3 months ago) <Brandon Mathis>
* | 0 e 2 b f f 1 - Merge pull request #1282 from myoung34/gist-fix (3 months ago) <Parker Moore>
| \ \
| * | 3 c a c 6 b 9 - The gist hashes have changed. They include letters now (3 months ago) <Marcus Young>
| / \
* | 8 4 e e 8 d 0 - Merge pull request #1281 from elbowdonkey/master (3 months ago) <Parker Moore>
| \ \
```

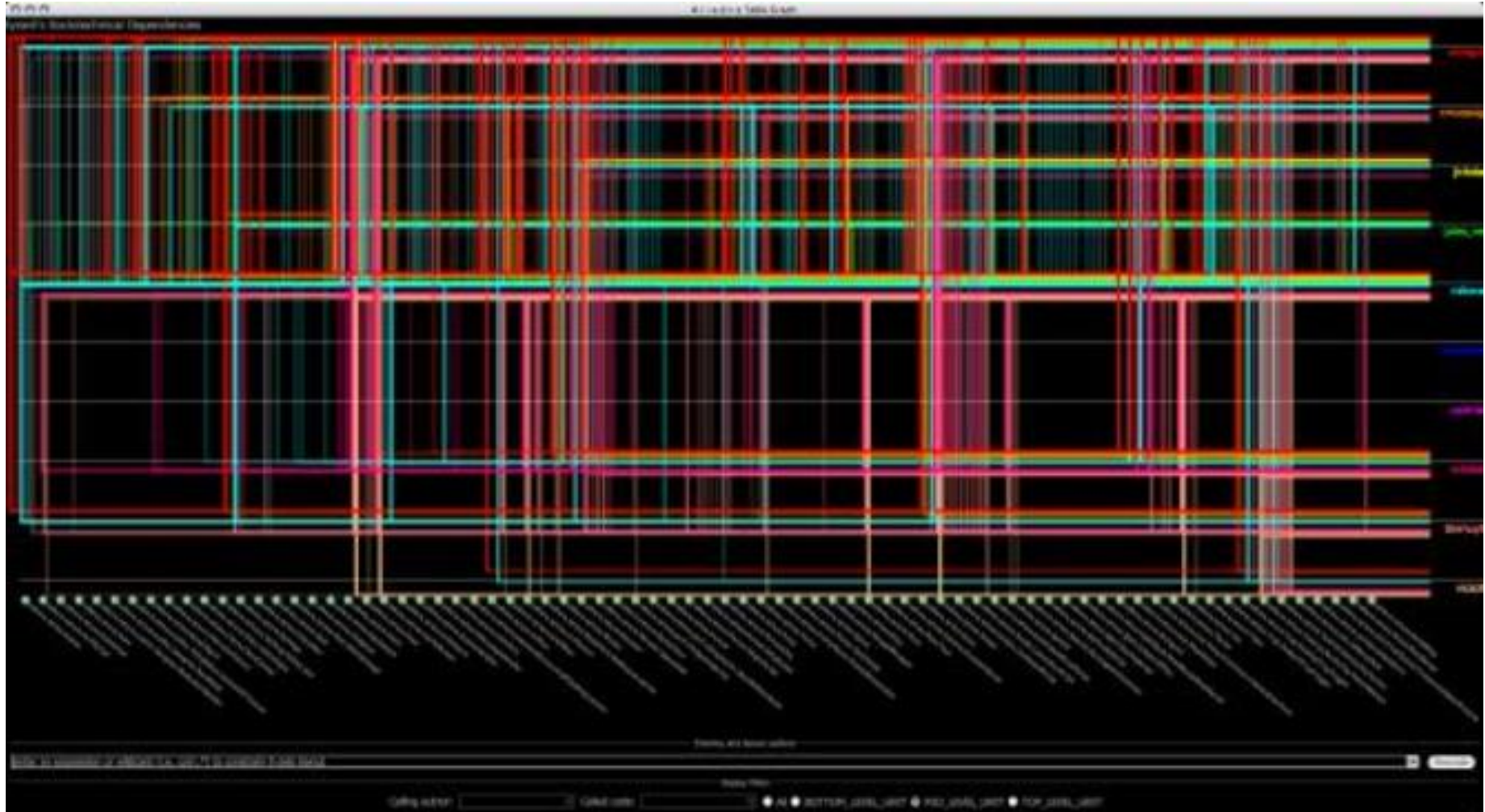
Advanced topic #1: history

```
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 1) <php
8174ca78 John Ennes 2013-10-28 08:36:08 +0000 2)
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 3) /**
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 4)  * @file
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 5)  * Used to automatically log out a user after a preset time.
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 6) */
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 7)
5743b72c Andy Kirkham 2006-05-16 08:11:55 +0000 8) /**
7a229a73 crasback 2013-05-18 00:58:11 +0000 9)  * Implements hook_permission().
5743b72c Andy Kirkham 2006-05-16 08:11:55 +0000 10) */
b445f86f James E Glasgow 2012-02-03 18:52:23 -0700 11) function autologout_permission() {
5bc3a43 James E Glasgow 2009-09-19 04:23:38 +0000 12)     return array(
afe9b95c John Ennes 2013-10-28 08:36:08 +0000 13)         'change own logout threshold' => array(
a5566735 (andrew 2012-07-30 09:20:47 -0400 14)             'title' => t('Change own logout threshold'),
7962aa3 (cristtendon 2014-08-27 07:52:51 +0000 15)             'description' => t('Selected users will be able to edit their own logout threshold.'),
a5566735 (andrew 2012-07-30 09:20:47 -0400 16)         ),
afe9b95c John Ennes 2013-10-28 08:36:08 +0000 17)         'administer autologout' => array(
a5566735 (andrew 2012-07-30 09:20:47 -0400 18)             'title' => t('Administer Autologout'),
7962aa3 (cristtendon 2014-08-27 07:52:51 +0000 19)             'description' => t('Administer the autologout settings.'),
a5566735 (andrew 2012-07-30 09:20:47 -0400 20)         ),
5bc3a43 James E Glasgow 2009-09-19 04:23:38 +0000 21)     );
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 22) }
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 23)
^5e8452c Andy Kirkham 2006-05-19 08:36:13 +0000 24) /**
afe9b95c John Ennes 2013-10-28 08:36:08 +0000 25)  * Implements hook_menu().
5bc3a43 James E Glasgow 2009-09-19 04:23:38 +0000 26) */
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 27) function autologout_menu() {
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 28)     $items = array();
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 29)
93a46cb (andrew 2012-08-18 15:52:49 -0400 30)     $items['admin/config/people/autologout'] = array(
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 31)         'title' => 'Auto Logout',
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 32)         'description' => 'Administer Auto Logout settings.',
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 33)         'page callback' => 'Drupal_get_form',
6e9dc88c quickstart 2012-06-22 08:02:34 -0500 34)         'page arguments' => array('autologout_settings'),
-1
```

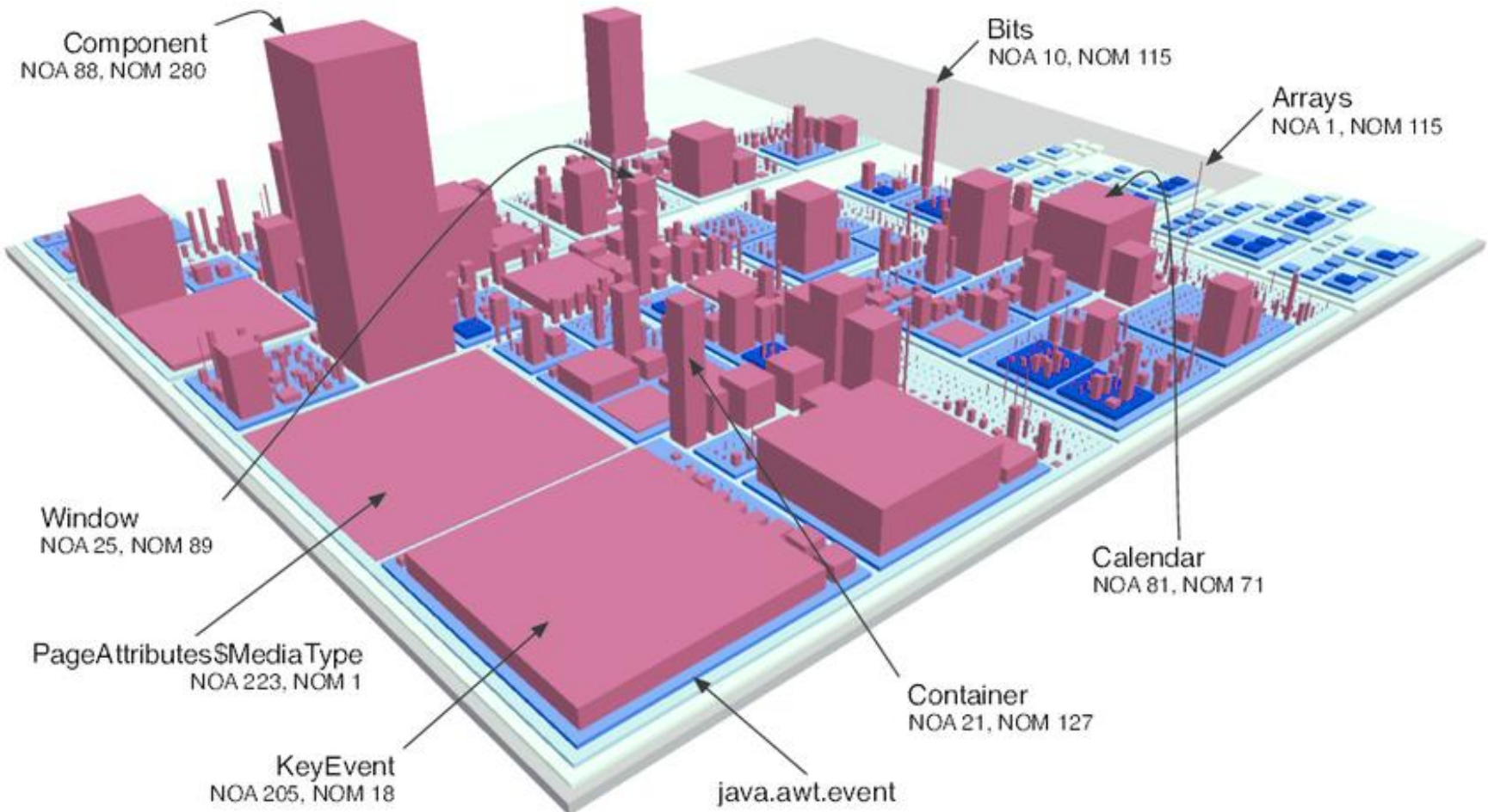
Advanced topic #2: visualization



Advanced topic #2: visualization



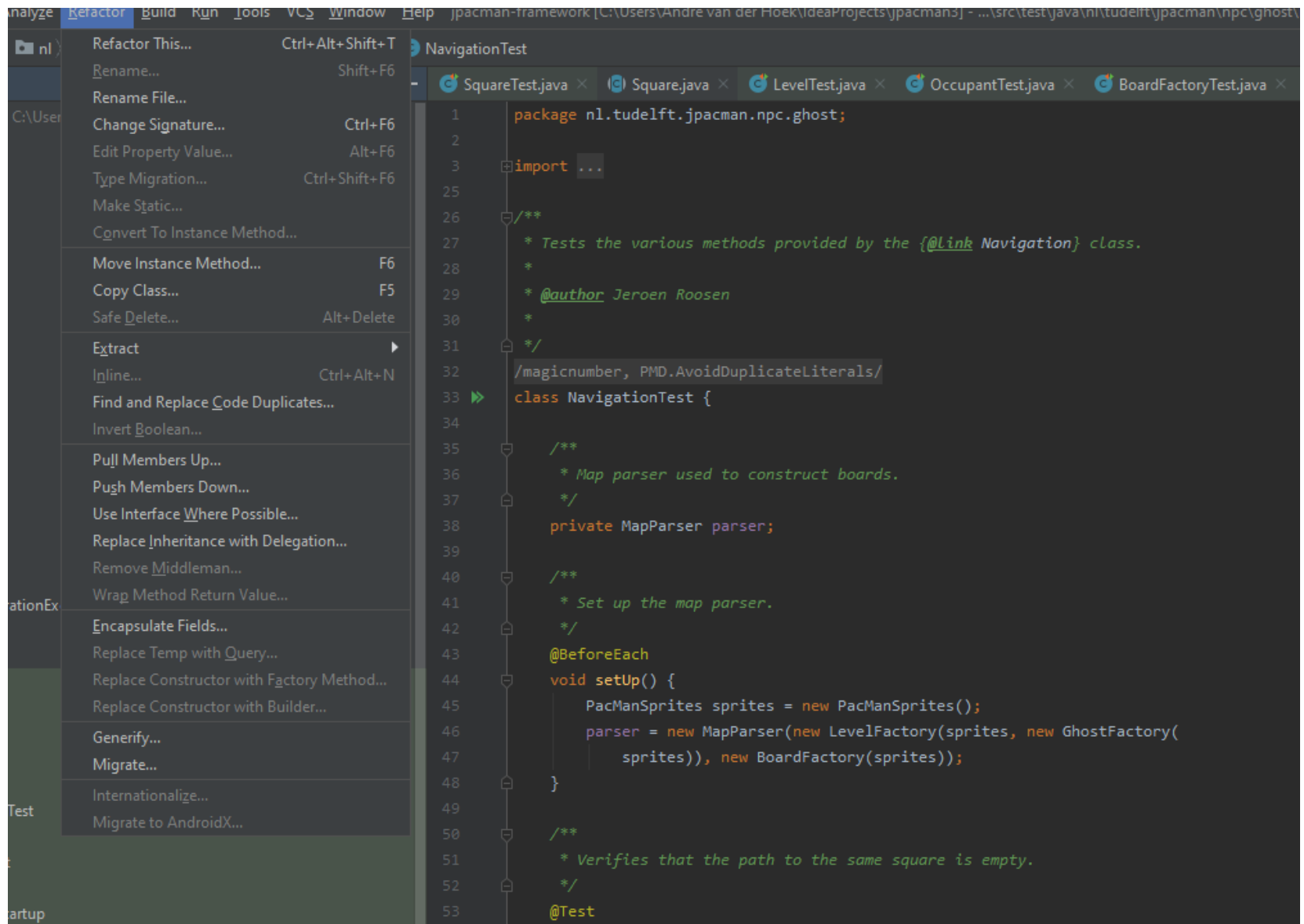
Advanced topic #2: visualization



Advanced topic #3: refactoring

- Refactoring is the process of changing a software system in such a way that it does not alter the external behavior of the code yet improves its internal structure.

Advanced topic #3: refactoring



The screenshot shows an IDE window with a refactoring menu open. The menu includes options like 'Refactor This...', 'Rename...', 'Extract', 'Pull Members Up...', and 'Migrate...'. The background code is a Java class named 'NavigationTest' with several methods and annotations.

```
package n1.tudelft.jpacman.npc.ghost;

import ...

/**
 * Tests the various methods provided by the {@link Navigation} class.
 *
 * @author Jeroen Roosen
 */
/magicnumber, PMD.AvoidDuplicateLiterals/
class NavigationTest {

    /**
     * Map parser used to construct boards.
     */
    private MapParser parser;

    /**
     * Set up the map parser.
     */
    @BeforeEach
    void setUp() {
        PacManSprites sprites = new PacManSprites();
        parser = new MapParser(new LevelFactory(sprites, new GhostFactory(
            sprites)), new BoardFactory(sprites));
    }

    /**
     * Verifies that the path to the same square is empty.
     */
    @Test
```


All-too-frequent attitude

- This code is a pile of crap
- The person who wrote it had no idea what they were doing
- I would have done such a better job
- I am way better than this, maybe I should find another place [organization] that deserves my skills

More fruitful attitude

- Legacy code made the application grow
- Legacy code has time on its side
- Seeing legacy code for who it really is
- I will not complain if I do not intend to improve the code

Enduring principles

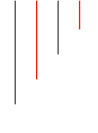
1. Respect old code and the wisdom it contains
2. Accept you cannot understand it all
3. Realize every situation is unique
4. Check the details
5. Verify assumptions
6. Proceed with change carefully
7. Leave the code in a better place than you found it

Homework (team)

- Make sure to finish last week's homework
- (Due date: 17th at noon)

Homework (individual)

- Make sure to regularly update your personal diary, including an entry for today's lecture
- (Due date: 17th at noon)



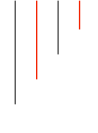
- Similar to the midterm (format tbd)

Parting quote #1

“This is one of the most difficult tasks in programming because you are not really reading code, but the intentions and mind set of the person who wrote it. Sometimes you seem to understand the code itself, but you may ask yourself, why he/she did that? At some point you may ask yourself, did the programmer understand what they were doing or is it me? How do you decide?” – Mario Burges
[<https://www.quora.com/How-do-I-learn-to-read-code>]

Parting quote #3

*“Any fool can write code that a computer can understand.
Good programmers write code that humans can understand” –
Martin Fowler [ThoughtWorks]*



“Read with an objective. Read by being selectively ignorant. Read bravely and patiently. Read with an understanding of the domain.” – Lee Martie [Research staff engineer, MIT-IBM Watson AI Lab]

The end



Thank you.