



GI TAV Arbeitskreis

Testen objektorientierter Programme/ Modellbasiertes Testen (TOOP/MBT)

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25 Jahre TAV, ZIMT Bremen, 24.06.2016

Agenda



11:15 Begrüßung, Agenda

11:20 Vorträge von Helmut Goetz und Ivan Jovanovikj

12:30 *Mittagsessen*

13:40 Neuwahlen Sprecher für TOOP

13:50 Kurzbericht TOOP der TAV 38 (Paderborn, 16. Oktober 2015)

13:55 Kurzvorstellung Beispiel (Web-ATM, Selenium, Integrity, Wetator, Cucumber, ...)

14:05 Gruppenarbeit Evaluationsmatrix MBT, KDT, BDD

15:10 Ergebnisse & Abschluss

15:30 Ende

Vorträge



Helmut Goetz:

MBT Einführung in die Praxis

Ivan Jovanovikj:

Towards Applying Model-Based Testing in Test Case Migration



Neuwahlen Sprecher der TOOP



Was bisher geschah...



Kurzbericht TOOP



- TAV 37 (Friedrichshafen, 6.02.15) & danach
 - Abstimmung: „Bezug zwischen MBT, KDT und BDD“
 - Arbeitskreis: Artikel „Drei Methoden, ein Ziel: Test-automatisierung mit BDD, MBT & KDT im Vergleich“
- TAV 38 (Paderborn, 16.10.15) & danach
 - Artikel vorgestellt
 - Diskussion zu MBT, BDD und KDT
 - Arbeitskreis: Konkretisierung mit „Web-ATM“- Beispiel

Bisherige Erkenntnisse



- Artikel-Fazit:
 - BDD einfacher
 - MBT skaliert besser
 - KDT guter Kern für BDD & MBT
- Diskussion auf TAV 38
 - ROI der Methoden wegen hoher Investitionskosten
 - Evaluationskriterien, gegliedert nach Teststufen!
 - Kernkriterien: Wartbarkeit, Wiederverwendbarkeit und Coverage
 - Ziel: Ausarbeitung, **Auswertung** und Vergleich!

Gruppenarbeit Evaluationsmatrix



Automatisierung Testentwicklung		MBT	BDD	MDT
Testentwurf				
Coverage Aussage	ja/nein	ja (Kinder Kaufen Pflanze ...)	ja (User Story)	—
Wartbarkeit	1-6		nein (?)	
Wiederverwendbarkeit		ja		
Testrealisierung				
Wartbarkeit		Wenig Raum für Kreativität / Erfahrungsbasiertes Testen "trügerische Sicherheit bei Vollständigkeit / Korrektheit der Modelle"	~	
Wiederverwendbarkeit	m / n.m.	ja (?)		m (Kagami)
Testausführung				
Coverage	ja/nein	Falsche Abstraktionslevel	ja (Szenari)	nein

→ fehlender / hoher
Testentwurf

Gruppenarbeit Evaluationsmatrix



- Gruppen:
 - MBT, BDD, KDT
- Kernkriterien auf Beispiel „Web-ATM“:
 - Wartbarkeit, Coverage, Wiederverwendbarkeit
- Ziel:
 - Evaluationsmatrix (d.h. Kernkriterien ausgewertet)

Web-ATM und Selenium



195.81.26.45:8080/ATM/resources/trend/xhtml/pc/BOEditor.do

Diigolet Most Visited Erste Schritte Aktuelle Nachrichten Karlsruhe: Katalog der ... https://www.google.c... Add to Clipperz http://www.fhserve.co... https://www.linkedin....

ATM Example

Enter Amount

ATM

Manage Customers

Manage Cards

Amount: 10.

Next Cancel

java.lang.NullPointerException

Untitled (untitled suite) - Selenium IDE 2.9.1 *

File Edit Actions Options Help

Base URL http://195.81.26.45:8080/

Fast Slow

Test Case

Untitled *

Command	Target	Value
open	/ATM/resources/trend/xhtml...	
type	id=aj_j_username	tav
type	id=aj_j_password	tav_2016
clickAndWait	id=loginButton	
click	id=cBrowser:1:ls	
clickAndWait	id=buttonPanel:Next	
clickAndWait	id=buttonPanel:Save	

Command clickAndWait

Target id=buttonPanel:Save

Value

Runs: 0

Failures: 0

Log Reference UI-Element Rollup

clickAndWait(locator)

Generated from click(locator)

Arguments:

- locator - an element locator

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Desktop DE 23:24

Web-ATM und Selenium (Scripted)



195.81.26.45:8080/ATM/resources/trend/xhtml/umlrunner/umlrunner.xhtml?trend.refreshView=true&trn

Diigolet Most Visited Erste Schritte Aktuelle Nachrichten Karlsruhe: Katalog der ... https://www.google.c...

ATM Example

Please login

Menu
Index
Back

Name:

Password:

Login

If you've lost your password, please go to [the lost password page](#) and enter your e-mail

We will then send your password by mail to your e-mail account.

PIN-Eingabe_Manuell (untitled suite) - Selenium IDE 2.9.1 *

File Edit Actions Options Help

Base URL http://195.81.26.45:8080/

Fast Slow

Test Case

PIN-Eingab...

Command	Target	Value
open	/ATM/resources/tren...	
type	id=aj_j_username	tav
type	id=aj_j_password	tav_2016
clickAndWait	id=loginButton	
click	id=cBrowser:8:ls	
clickAndWait	id=buttonPanel:Next	
type	id=cEditor:aj_pin	1111
clickAndWait	id=buttonPanel:Save	
clickAndWait	id=buttonPanel:Return	

Command open

Target /ATM/resources/trend/xhl Select Find

Value

Runs: 0

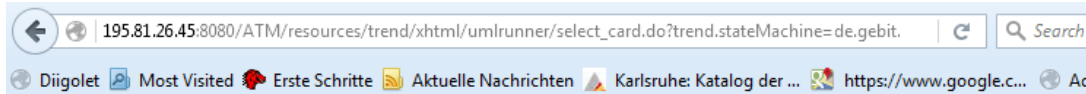
Failures: 0

Log Reference UI-Element Rollup Info Clear

[info] Playing test case PIN-Eingabe_Manuell

[info] Executing: [open | /ATM/resources/trend/xhtml/umlrunner/umlrunner.xhtml?trend.refreshView=true&trendConversationId=0 |]

Web-ATM und Selenium (Scripted)



ATM Example

Select Card

ATM

Manage Customers

Manage Cards

Result of Search		
Number ↕	Customer Name ↕	Customer Firstname
222	Doe	Jane
1234	Doe	John
4294967296	Smith	John
4294967297	Smith	John
4294967300	Smith	Jane
8589934592	F.	M.
8589934594	F.	M.
17179869185	Deh	Sok
21474836480	Micky	Maus

Next Cancel

PIN-Eingabe_Manuell (untitled suite) - Selenium IDE 2.9.1 *

File Edit Actions Options Help

Base URL http://195.81.26.45:8080/

Fast Slow

Test Case

PIN-Eingab...

Command	Target	Value
open	/ATM/resources/tren...	
type	id=aj_j_username	tav
type	id=aj_j_password	tav_2016
clickAndWait	id=loginButton	
click	id=cBrowser:8:ls	
clickAndWait	id=buttonPanel:Next	
type	id=cEditor:aj_pin	1111
clickAndWait	id=buttonPanel:Save	
clickAndWait	id=buttonPanel:Return	

Command open

Target /ATM/resources/trend/xh...

Value

Runs: 0

Failures: 0

Log Reference UI-Element Rollup Info Clear

[info] Playing test case PIN-Eingabe_Manuell

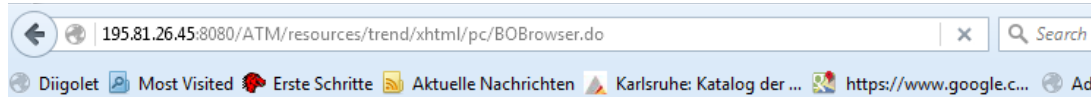
[info] Executing: |open | /ATM/resources/trend/xhtml/umlranner /umlranner.xhtml?trend.refreshView=true&trend.conversationId=0 | |

[info] Executing: |type | id=aj_j_username | tav |

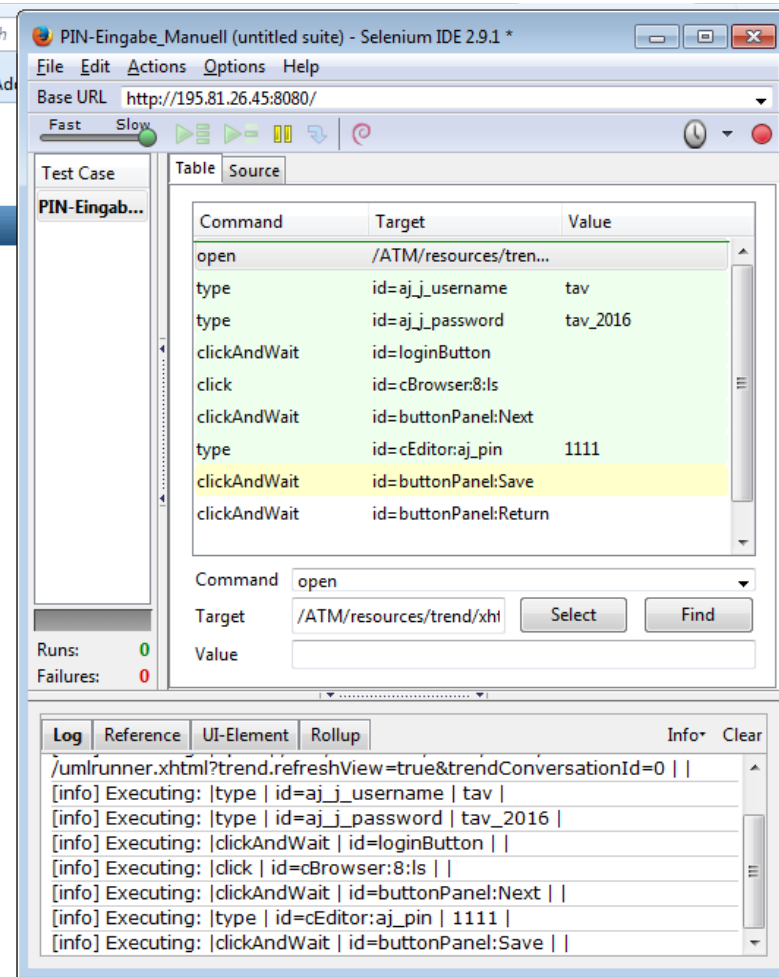
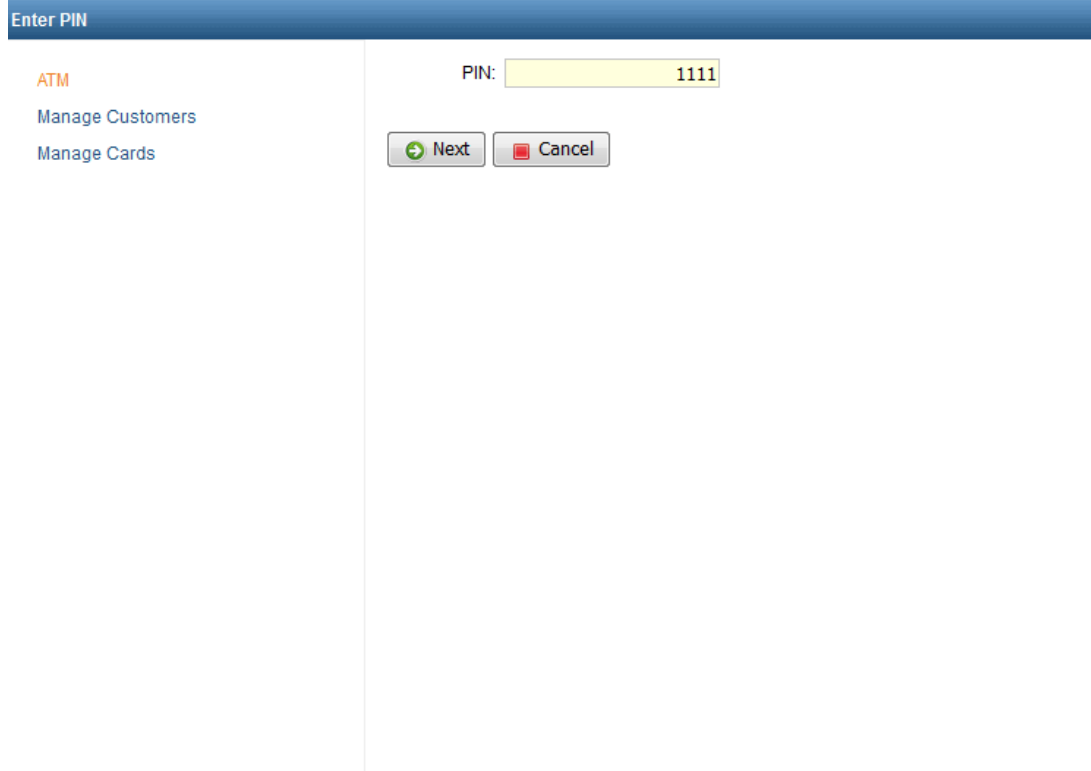
[info] Executing: |type | id=aj_j_password | tav_2016 |

[info] Executing: |clickAndWait | id=loginButton | |

Web-ATM und Selenium (Scripted)



ATM Example



Web-ATM und Selenium (Scripted)



195.81.26.45:8080/ATM/resources/trend/xhtml/pc/BOEditor.do

Diigolet Most Visited Erste Schritte Aktuelle Nachrichten Karlsruhe: Katalog der ... https://www.google.c...

ATM Example

Show Account Details

ATM

Manage Customers

Manage Cards

Number: 21474836481

Balance: 4444.00

Limit: 0.00

Name: Micky

Firstname: Maus

Deposit Withdraw Cancel

PIN-Eingabe_Manuell (untitled suite) - Selenium IDE 2.9.1 *

File Edit Actions Options Help

Base URL http://195.81.26.45:8080/

Fast Slow

Test Case

PIN-Eingab...

Command	Target	Value
open	/ATM/resources/tren...	
type	id=aj_j_username	tav
type	id=aj_j_password	tav_2016
clickAndWait	id=loginButton	
click	id=cBrowser:8:ls	
clickAndWait	id=buttonPanel:Next	
type	id=cEditor:aj_pin	1111
clickAndWait	id=buttonPanel:Save	
clickAndWait	id=buttonPanel:Return	

Command open

Target /ATM/resources/trend/xhl Select Find

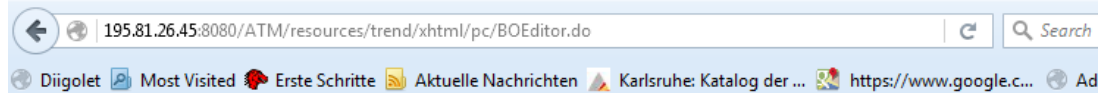
Value

Runs: 0

Failures: 0

Log	Reference	UI-Element	Rollup	Info	Clear
/umlrunner.xhtml?trend.refreshView=true&trendConversationId=0					
[info] Executing: type id=aj_j_username tav					
[info] Executing: type id=aj_j_password tav_2016					
[info] Executing: clickAndWait id=loginButton					
[info] Executing: click id=cBrowser:8:ls					
[info] Executing: clickAndWait id=buttonPanel:Next					
[info] Executing: type id=cEditor:aj_pin 1111					
[info] Executing: clickAndWait id=buttonPanel:Save					

Web-ATM und Selenium (Scripted)



ATM Example

Select Card

ATM

Manage Customers

Manage Cards

Result of Search		
Number ↕	Customer Name ↕	Customer Firstname
222	Doe	Jane
1234	Doe	John
4294967296	Smith	John
4294967297	Smith	John
4294967300	Smith	Jane
8589934592	F.	M.
8589934594	F.	M.
17179869185	Deh	Sok
21474836480	Micky	Maus

Next Cancel

PIN-Eingabe_Manuell (untitled suite) - Selenium IDE 2.9.1 *

File Edit Actions Options Help

Base URL http://195.81.26.45:8080/

Fast Slow

Test Case

PIN-Eingab...

Command	Target	Value
open	/ATM/resources/tren...	
type	id=aj_j_username	tav
type	id=aj_j_password	tav_2016
clickAndWait	id=loginButton	
click	id=cBrowser:8:ls	
clickAndWait	id=buttonPanel:Next	
type	id=cEditor:aj_pin	1111
clickAndWait	id=buttonPanel:Save	
clickAndWait	id=buttonPanel:Return	

Command open

Target /ATM/resources/trend/xhtml/pc/BOEditor.do

Value

Runs: 1

Failures: 0

Log Reference UI-Element Rollup Info+ Clear

[info] Executing: |type | id=aj_j_password | tav_2016 |

[info] Executing: |clickAndWait | id=loginButton | |

[info] Executing: |click | id=cBrowser:8:ls | |

[info] Executing: |clickAndWait | id=buttonPanel:Next | |

[info] Executing: |type | id=cEditor:aj_pin | 1111 |

[info] Executing: |clickAndWait | id=buttonPanel:Save | |

[info] Executing: |clickAndWait | id=buttonPanel:Return | |

[info] Test case passed

Web-ATM Endgegner



ATM Example


Enter Amount

ATM
Manage Customers
Manage Cards

Amount:

Next Cancel

Confirmation

 The data was changed. Do you want to save your changes?

KDT of Web-ATM



- Keyword-Driven Testing am Beispiel
- Untersuchte Werkzeuge:
 - Wetator (www.wetator.org)
 - Unterstützt nur Test von Web-Anwendungen
 - Ca. 30 vordefinierte Keywords
 - Integrity (www.integrity-tf.org)
 - Unterstützt prinzipiell jede Plattform
 - Keine vordefinierten Keywords
 - Out-of-the-box nur Test von Swing-Anwendungen

Test mit Wetator



Default Command Set	Minimum Command Set	All Commands (alphabetical)	All Commands (by command set)
+ Describe		Describes this test case using formatted text.	
+ Open URL		Open a given URL in the current window.	
+ Use Module		Calls another test and executes all commands as part of this test.	
+ Click On		Click with the mouse on the specified element.	
+ Click Double On		Double click with the mouse on the specified element.	
+ Click Right On		Right click with the mouse on the specified element.	
+ Set		Sets the value of an entry field.	
+ Select		Selects an entry from a list.	
+ Deselect		Deselects an entry from a list.	
+ Close Window		Close the current window or close a window by name.	
+ Mouse Over		Moves the mouse over the specified item.	
+ Go Back		Goes back in the current window using the back button.	
+ Assert Title		Assert that the page title matches the given one.	
+ Assert Content		Assert that the content matches the given one.	
+ Assert Enabled		Asserts, that an item is enabled and not readonly.	
+ Assert Disabled		Asserts, that an item is disabled or readonly.	
+ Assert Set		Assert that the value of an entry field matches the given one.	
+ Assert Selected		Asserts, that an entry from a list is selected.	
+ Assert Deselected		Asserts, that an entry from a list is deselected.	
+ Exec Java		Executes the defined java method.	

Erlaubt die Ausführung beliebigen Codes

Test mit Wetator



depositwithdraw.wet

\\Wetator-Test\depositwithdraw.wet

Command	Parameter
open-url	ATM
set	Name
set	Password
click-on	Login
# Deposit money	
select	cBrowser:7:ls
click-on	Next
set	PIN
click-on	Next
assert-content	Balance
assert-set	Balance
assert-set	Limit
click-on	Deposit
set	Amount
click-on	Next
assert-set	Balance
click-on	Cancel
# Withdraw money	
select	cBrowser:7:ls
click-on	Next
set	PIN
click-on	Next
assert-set	Balance
click-on	Withdraw
set	Amount
click-on	Next
assert-content	limit is reached
set	Amount
click-on	Next
assert-set	Balance
click-on	Cancel

Add Line Delete Line

WTE XSD Source

No	Name	Steps Graph
1	✓ ..\wet-ws\Wetator-Test\depositwithdraw.wet	29/29

ATM Example

Enter PIN

ATM
Manage Customers
Manage Cards

PIN:

Next Cancel

Line	Command	Pa
1	✓ open-url	AT
2	✓ set	Ne
3	✓ set	Pa
4	✓ click-on	Lo
5		De
6	✓ select	cB
7	✓ click-on	Ne
8	✓ set	PI
9	✓ click-on	Ne
10	✓ assert-content	Be
11	✓ assert-set	Be
12	✓ assert-set	Li
13	✓ click-on	De
14	✓ set	An
15	✓ click-on	Ne
16	✓ assert-set	Be
17	✓ click-on	Ca
18		W
19	✓ select	cB
20	✓ click-on	Ne

Duration
00:00:09
00:00:08
00:00:07

st\depositwithdraw.wet (IE11)

Parameter 2	Duration
-	2.8s
tav	0s
****	0s
-	2.7s
-	0s
-	0.4s
-	0.2s
4444	0s
-	0.3s
-	0s
2000.00	0s
50.00	0s
-	0.2s
100.00	0s
-	0.3s
2100.00	0s
-	0.3s
-	0s
-	0s
-	0.2s

Test mit Integrity



- Eigene Anbindung an Web-Anwendung notwendig → Selenium

```
packagedef trend.fixtures with
```

```
    constant waitForNothing /**
    constant waitAutomatic * Calls {@link Selenium#isElementPresent(String)}
    constant waitForPageLoad *
    *
    calldef open uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#open
    calldef click uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#click
    calldef clickXPath uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#clickXPath
    calldef openMenu uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#openMenu
    calldef setText uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#setText
    calldef quit uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#quit
    calldef focus uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#focus
    calldef startMenu uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#startMenu

    @param anId
    ID of the element
    */
    @FixtureMethod(description = "Test if the web component \"${component}\" is present")
    public boolean isElementPresent(@FixtureParameter(name = "component") String aComponent) {
        return selenium.isElementPresent(aComponent);
    }
}
```

```
testdef isEnabled uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#isEnabled
testdef isPresent uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#isElementPresent
testdef testAttribute uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#testAttribute
testdef testText uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#testText

testdef wait uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#wait
testdef pageReloads uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#waitForPageToLoad
testdef pageNotReloads uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#waitForPageNotToReload
calldef waitComponent uses de.gebit.integrity.bindings.gui.trend.fixtures.web.BasicFixture#waitComponentPresent
```

```
packageend
```

Test mit Integrity



Höhere
Abstraktionslevel
durch Sub-Suites

```
packagedef tests.atm with
  // URL for ATM sample
  constant url "http://195.81.26.45:8080/ATM"
  constant user "user"
  constant password "password"

  // wraps all other tests in the atm sample
  suitedef atmsample with
    suite login
    suite deposit
    suite withdraw
  suiteend

  // login
  suitedef login with
    call open url: url
    test isPresent component:
    call setText field: "username"
    call setText field: "password"
    call click id: "loginButton"
  suiteend

  // deposit
  suitedef deposit with
    call click id: "cBrowser:7:ls"
    call click id: "buttonPanel:Next"
    test isPresent component: "cEditor:pin"
```

Test Runner disconnected (6 successful, 1 failures, 1 exceptions) after 36s 200ms

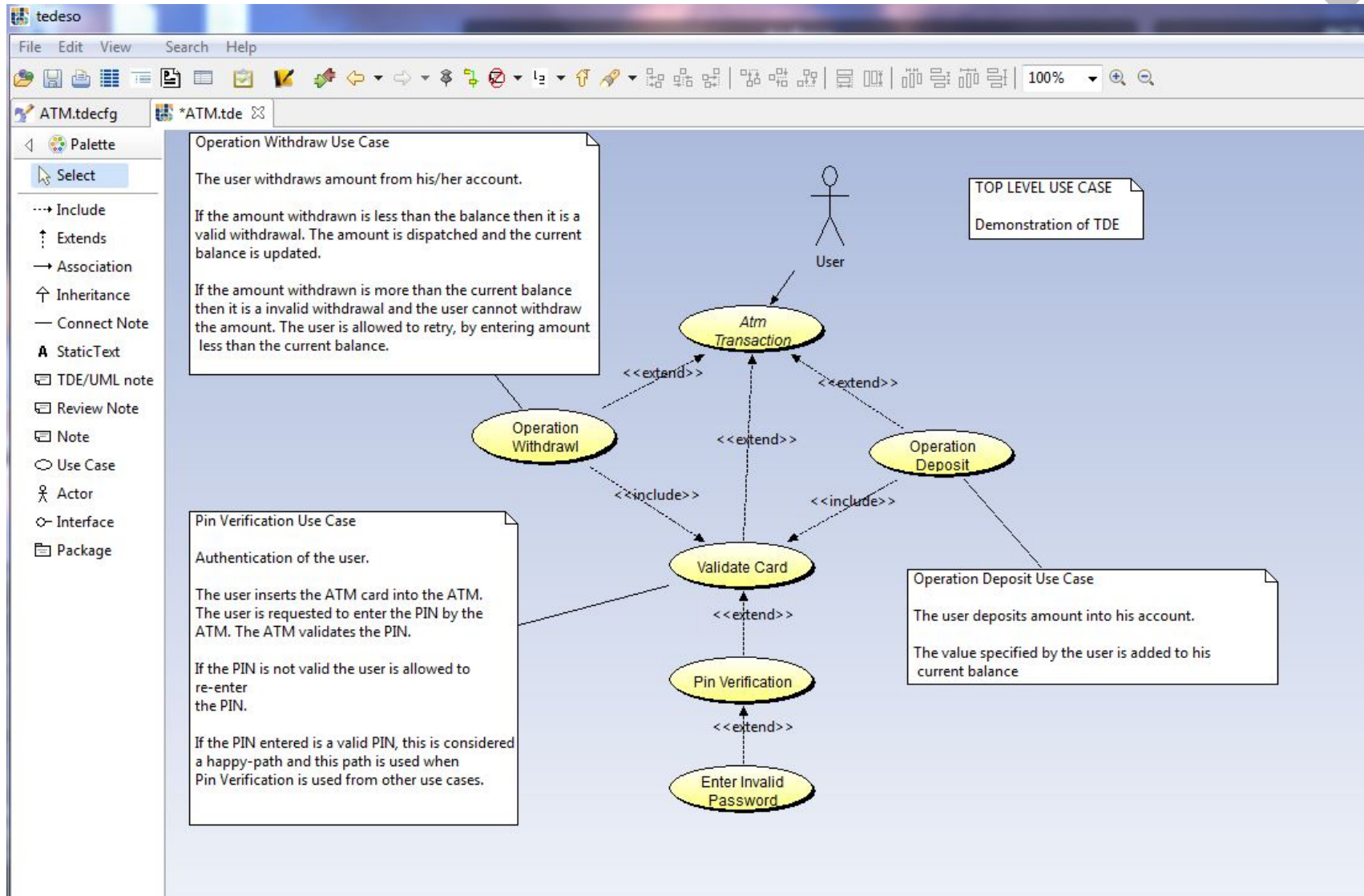
- Open the url "http://195.81.26.45:8080/ATM"
- ✓ Test if the web component "loginButton" is present
- Set text username
- Set text password
- Click the component with id: loginButton and waits for null
- trend.tests.atm.deposit...
- Click the component with id: cBrowser:7:ls and waits for null
- Click the component with id: buttonPanel:Next and waits for null
- ✗ Test if the web component "cEditor:pin" is present

KDT Auswertung

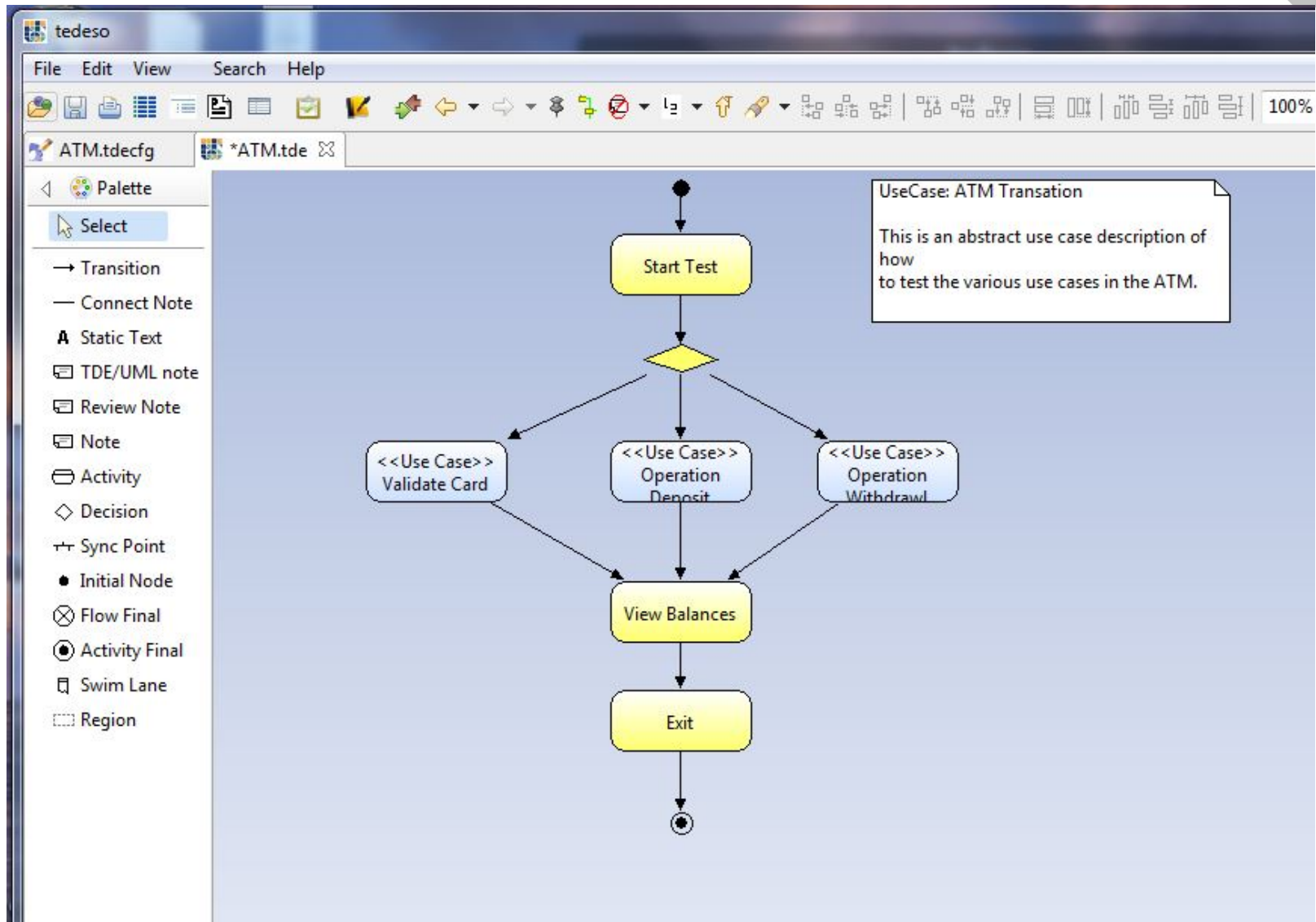


- **Zwei generelle Arten von Werkzeugen**
 - Domänenspezifische mit festgelegten Satz von Keywords → Beispiel: Wetator
 - Domänenunabhängige mit frei definierbaren Satz von Keywords → Beispiele: Integrity / FitNesse
- **Keywords oft auf niedrigerem Level als bei BDT**
 - Bildung von Sub-Suites nähert sich BDT an
 - BDT mehr an fachlicher Domäne orientiert, weniger an technischer

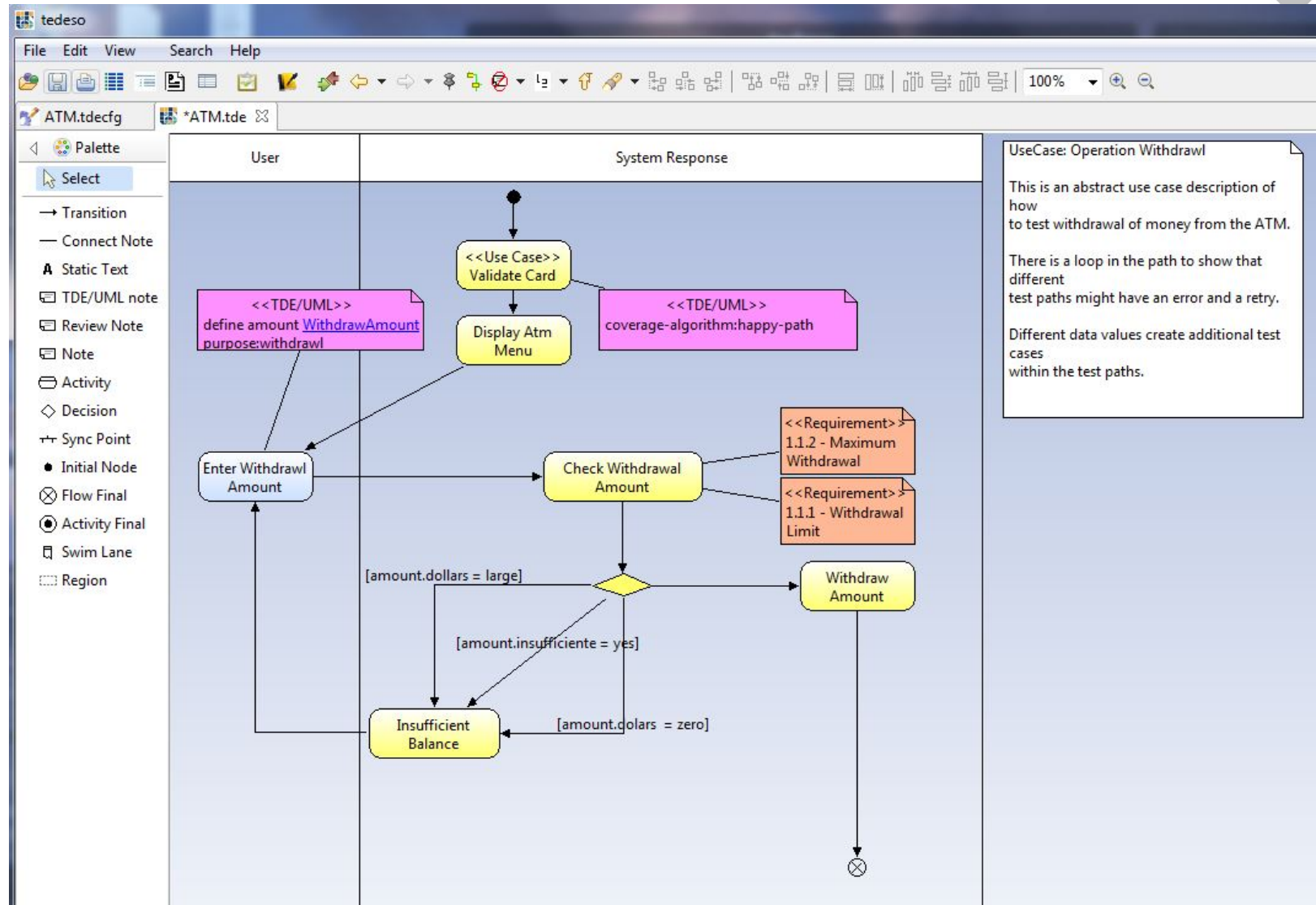
MBT of Web-ATM



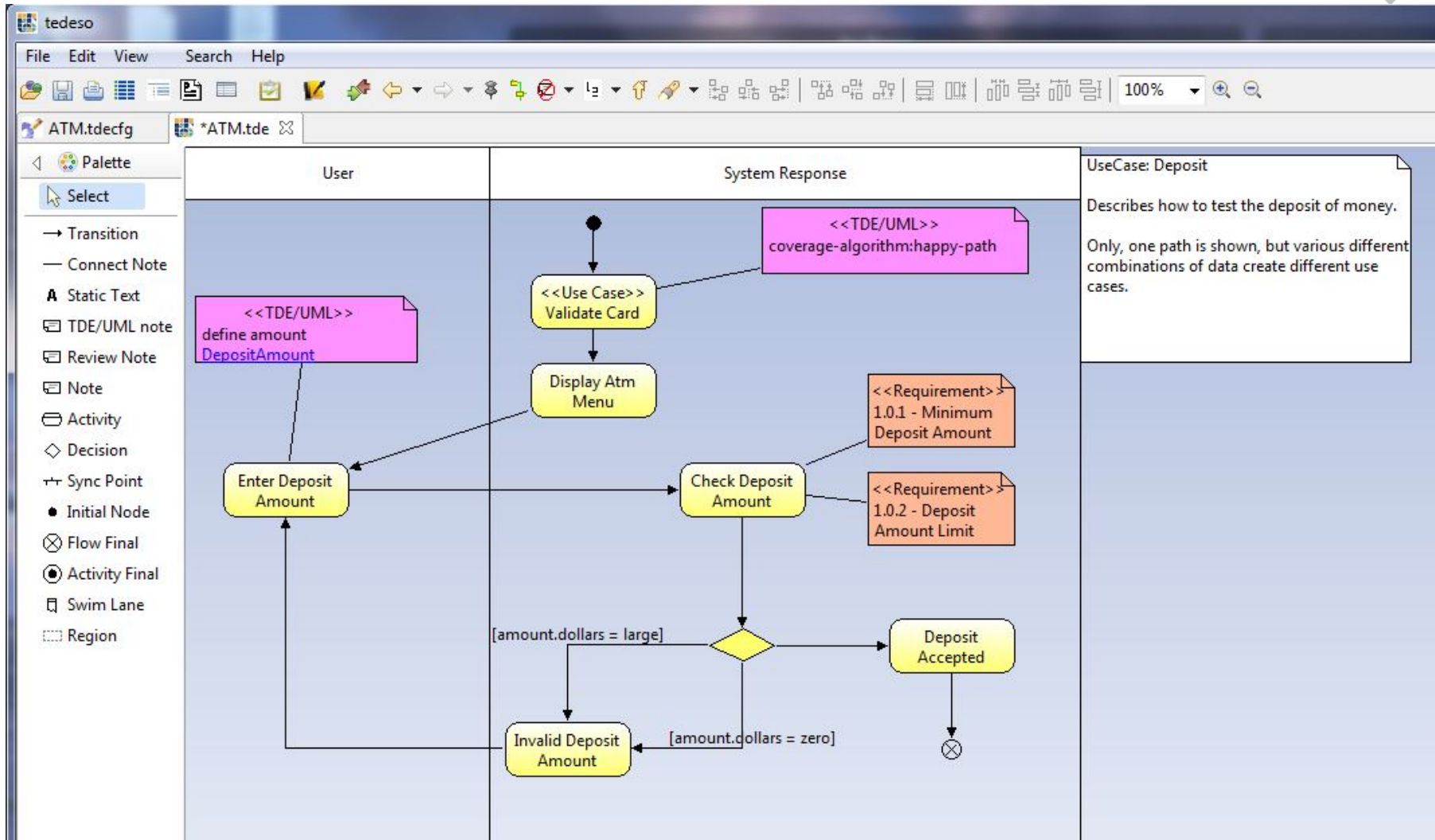
MBT of Web-ATM



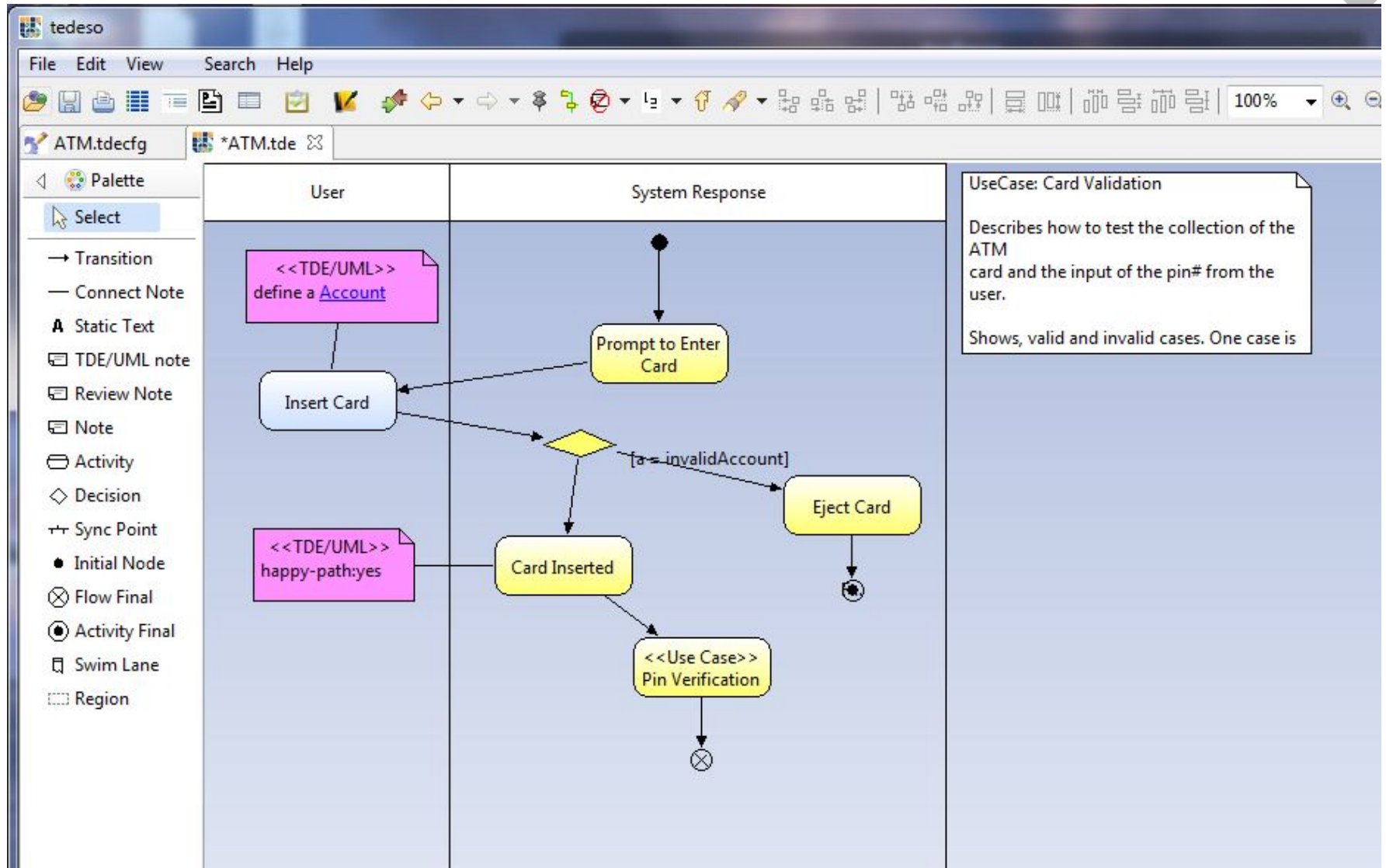
MBT of Web-ATM



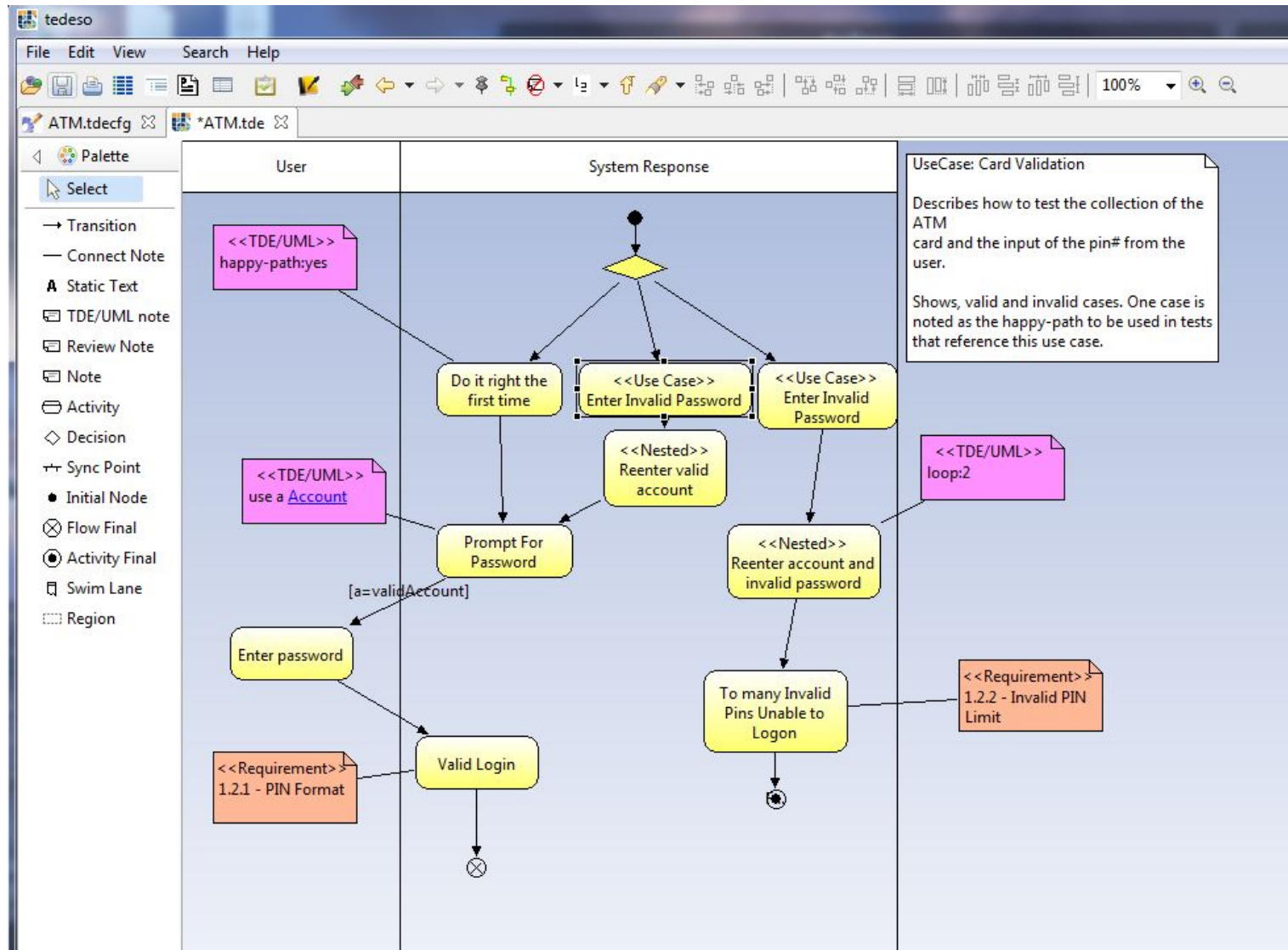
MBT of Web-ATM



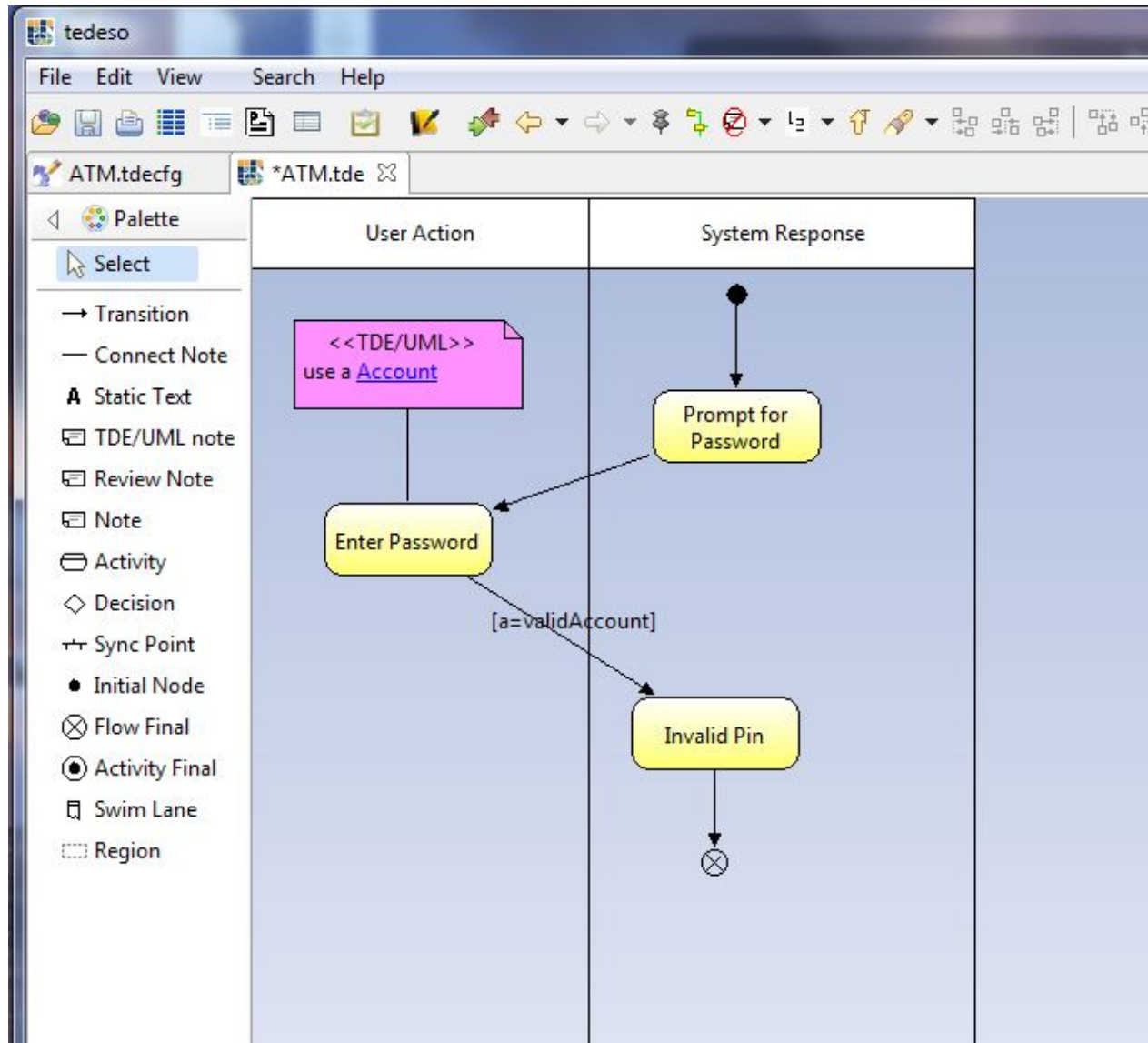
MBT of Web-ATM



MBT of Web-ATM



MBT of Web-ATM



BDD of Web-ATM



```
Java - ATMTes/FeatureFiles/login_new.feature - Eclipse
File Edit Navigate Search Project Run Window Help
login_new.feature
1 #Author: your.email@your.domain.com
2 #Keywords Summary :
3 #Feature: List of scenarios.
4 #Scenario: Business rule through list of steps with arguments.
5 #Given: Some precondition step
6 #When: Some key actions
7 #Then: To observe outcomes or validation
8 #And,But: To enumerate more Given,When,Then steps
9 #Scenario Outline: List of steps for data-driven as an Examples and <placeholder>
10 #Examples: Container for s table
11 #Background: List of steps run before each of the scenarios
12 #""" (Doc Strings)
13 #| (Data Tables)
14 #@ (Tags/Labels):To group Scenarios
15 #<> (placeholder)
16 #""
17 ## (Comments)
18
19 #Sample Feature Definition Template
20 @tag
21 Feature: Title of your feature
22   I want to use this template for my feature file
23
24 @tag1
25 Scenario: Title of your scenario
26 Given I want to write a step with precondition
27   And some other precondition
28 When I complete action
29   And some other action
30   And yet another action
31 Then I validate the outcomes
32   And check more outcomes
33
34 @tag2
35 Scenario Outline: Title of your scenario outline
36 Given I want to write a step with <name>
37 When I check for the <value> in step
38 Then I verify the <status> in step
39
40 Examples:
41   | name | value | status |
42   | name1 | 5 | success |
43   | name2 | 7 | Fail |
44
```

BDDing Web-ATM



The screenshot shows the Eclipse IDE with the following components:

- Title Bar:** Java - ATMTTest/FeatureFiles/login_new.feature - Eclipse
- Menu Bar:** File Edit Navigate Search Project Run Window Help
- Toolbar:** Standard Eclipse development tools.
- Left Panel (Project Explorer):** Shows the project structure for ATMTTest [ATMTTest master]. The 'FeatureFiles' folder is expanded, showing several feature files: addition.feature, cookbook_login.feature, login_new.feature (selected), login.feature, probe.feature, test.feature, and withdraw_money.feature. Below this, the 'src' and 'target' folders are visible, along with files like .classpath, .gitignore, .project, pom.xml, and README.md. A 'WebdriverMavenProject' is also listed at the bottom.
- Right Panel (Editor):** Displays the content of 'login_new.feature'. The text is as follows:

```
1 @tag
2 Feature: Log in
3   As a registered user
4   I want to log into the ATM application
5   so that i can use the ATM functions.
6
7 @tag1
8 Scenario: User logs into ATM Page
9   Given I am on the login page
10  When I provide the user name "tav"
11  And I provide the password "tav_2016"
12  And I press the login button
13  Then I should be successfully logged in
```
- Bottom Panel:** Shows the status of the editor as 'Writable' and 'Insert' mode, with a cursor position of '1 : 1'.

BDD of Web-ATM



```
Java - ATMTes/FeatureFiles/login_new.feature - Eclipse
File Edit Navigate Search Project Run Window Help
Quick Access Java Git Java Browsing

@tag
Feature: Log in
  As a registered user
  I want to log into the ATM application
  so that i can use the ATM functions.

  @tag1
  Scenario: User logs into ATM Page      # D:/Workspaces/BDD-Java/ATMTes/FeatureFiles/login_new.feature:8
    Given I am on the login page
    When I provide the user name "tav"
    And I provide the password "tav_2016"
    And I press the login button
    Then I should be successfully logged in

1 Scenarios (1 undefined)
5 Steps (5 undefined)
0m0,000s

You can implement missing steps with the snippets below:

@Given("^I am on the login page$")
public void i_am_on_the_login_page() throws Throwable {
    // Write code here that turns the phrase above into concrete actions
    throw new PendingException();
}

@When("^I provide the user name \"([^\"]*)\"$")
public void i_provide_the_user_name(String arg1) throws Throwable {
    // Write code here that turns the phrase above into concrete actions
    throw new PendingException();
}

@When("^I provide the password \"([^\"]*)\"$")
public void i_provide_the_password(String arg1) throws Throwable {
    // Write code here that turns the phrase above into concrete actions
    throw new PendingException();
}

@When("^I press the login button$")
public void i_press_the_login_button() throws Throwable {
    // Write code here that turns the phrase above into concrete actions
    throw new PendingException();
}

@Then("^I should be successfully logged in$")
public void i_should_be_successfully_logged_in() throws Throwable {
    // Write code here that turns the phrase above into concrete actions
    throw new PendingException();
}
```

BDD of Web-ATM



```
1 package stepDefinitions;
2
3 import cucumber.api.PendingException;
4 import cucumber.api.java.en.Given;
5 import cucumber.api.java.en.Then;
6 import cucumber.api.java.en.When;
7
8 public class LoginNewSteps {
9     @Given("I am on the login page$")
10     public void i_am_on_the_login_page() throws Throwable {
11         // Write code here that turns the phrase above into concrete actions
12         throw new PendingException();
13     }
14
15     @When("I provide the user name \"([^\"]*)\"$")
16     public void i_provide_the_user_name(String arg1) throws Throwable {
17         // Write code here that turns the phrase above into concrete actions
18         throw new PendingException();
19     }
20
21     @When("I provide the password \"([^\"]*)\"$")
22     public void i_provide_the_password(String arg1) throws Throwable {
23         // Write code here that turns the phrase above into concrete actions
24         throw new PendingException();
25     }
26
27     @When("I press the login button$")
28     public void i_press_the_login_button() throws Throwable {
29         // Write code here that turns the phrase above into concrete actions
30         throw new PendingException();
31     }
32
33     @Then("I should be successfully logged in$")
34     public void i_should_be_successfully_logged_in() throws Throwable {
35         // Write code here that turns the phrase above into concrete actions
36         throw new PendingException();
37     }
38 }
39
```

BDD of Web-ATM



```
Java - ATMTTest/FeatureFiles/login_new.feature - Eclipse
File Edit Navigate Search Project Run Window Help
Quick Access Java Git Java Browsing

Console
<terminated> login_new.feature [Cucumber Feature] C:\Program Files\Java\jre1.8.0_91\bin\javaw.exe (22.06.2016, 01:29:11)
@tag
Feature: Log in
  As a registered user
  I want to log into the ATM application
  so that i can use the ATM functions.

@tag1
Scenario: User logs into ATM Page # D:/Workspaces/BDD-Java/ATMTTest/FeatureFiles/login_new.feature:8
  Given I am on the login page # LoginNewSteps.i_am_on_the_login_page()
    cucumber.api.PendingException: TODO: implement me
      at stepDefinitions.LoginNewSteps.i_am_on_the_login_page(LoginNewSteps.java:12)
      at ?.Given I am on the login page(D:/Workspaces/BDD-Java/ATMTTest/FeatureFiles/login_new.feature:9)

    When I provide the user name "tav" # LoginNewSteps.i_provide_the_user_name(String)
    And I provide the password "tav_2016" # LoginNewSteps.i_provide_the_password(String)
    And I press the login button # LoginNewSteps.i_press_the_login_button()
    Then I should be successfully logged in # LoginNewSteps.i_should_be_successfully_logged_in()

1 Scenarios (1 pending)
5 Steps (4 skipped, 1 pending)
0m0,119s

cucumber.api.PendingException: TODO: implement me
  at stepDefinitions.LoginNewSteps.i_am_on_the_login_page(LoginNewSteps.java:12)
  at ?.Given I am on the login page(D:/Workspaces/BDD-Java/ATMTTest/FeatureFiles/login_new.feature:9)
```

BDD of Web-ATM



```
Java - ATMTest/FeatureFiles/login_new.feature - Eclipse
File Edit Navigate Search Project Run Window Help

Pa... Na... Pr... J...
LoginSteps.java StepDefs.java LoginNewSte... login_new.fe... Console
Quick Access Java Git Java Browsing

ATMTest [ATMTest mast
  > FeatureFiles
    addition.feature
    cookbook_login.feature
    login_new.feature
    login.feature
    probe.feature
    test.feature
    withdraw_money.feature
  > src
    > main
      > java
        > helperClasses
          ATMHelperClass.java
          HelperClass.java
        > pageObjects
          ATMPage.java
          BasicAuthPage.java
          CalculatorPage.java
          GooglePage.java
        > stepDefinitions
          DuplicateAmbiguc
          LoginNewSteos.jav

1 @tag
2 Feature: Log in
3   As a registered user
4   I want to log into the ATM application
5   so that i can use the ATM functions.
6
7 @tag1
8 Scenario: User logs into ATM Page
9   Given I am on the login page
10  When I provide the user name "tav"
11  And I provide the password "tav_2016"
12  And I press the login button
13  Then I should be successfully logged in

<terminated> login_new.feature [Cucumber Feature] C:\Program Files\Java\jre1.8.0_91\bin\javaw.exe (22.06.2016, 01:43:20)
@tag
Feature: Log in
  As a registered user
  I want to log into the ATM application
  so that i can use the ATM functions.
Starting ChromeDriver (v2.9.248315) on port 21390
Automated test run. We're running on chrome 51.0.2704.103

@tag1
Scenario: User logs into ATM Page # D:\Workspaces\BDD-Java\ATMTest\FeatureFiles\login_new.feature:8
  Given I am on the login page # StepDefs.i_am_on_the_login_page()
  When I provide the user name "tav" # StepDefs.i_provide_the_user_name(String)
  And I provide the password "tav_2016" # StepDefs.i_provide_the_password(String)
  And I press the login button # StepDefs.i_press_the_login_button()
  Then I should be successfully logged in # StepDefs.i_should_be_successfully_logged_in()

1 Scenarios (1 passed)
5 Steps (5 passed)
0m3,974s

Writable Insert 9:16
```

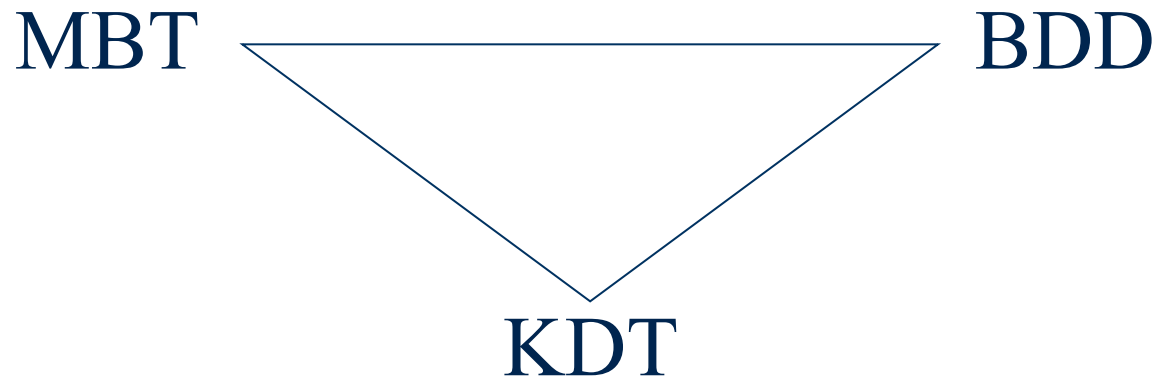
Gruppenarbeit



<http://195.81.26.45:8080/ATM/resources/trend/xhtmll/umlrunner/umlrunner.xhtml>

Benutzername: „tav“

Passwort: „tav_2016“



Gruppenarbeit





Ergebnisse & Abschluss

Ergebnisse & Abschluss



- Ziel erreicht?
- Weiteres Vorgehen

Tschüss & gute Heimfahrt

