Seminar 2
Eclipse
PROGRAMMING 3

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Installing

- Browse to `www.eclipse.org`
- Download *Eclipse IDE for Java Developers*
- Uncompress and run `eclipse`

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2 Environment

2.1 Workspace

Workspace

- Eclipse stores all the configuration and projects under directory *workspace*
- When Eclipse starts, you are prompted to choose a workspace location
- Select `File>Switch workspace` to change workspace

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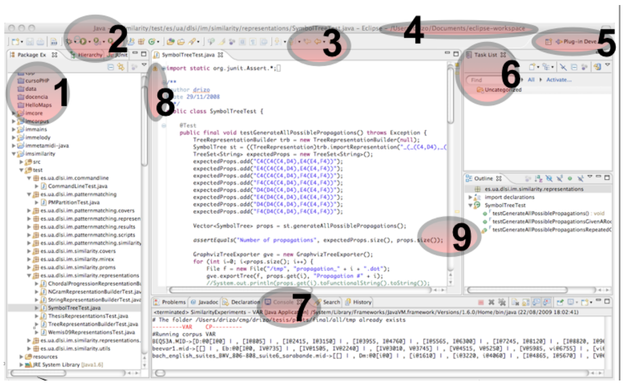
2.2 Interface

Interface

Tools



1. Projects and packages	4. Current workspace	7. Console
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3 Projects

3.1 Creation

Project creation

- `File > New > Java project`
  - Project name
  - Choose a new directory or accept the default one
- A directory will be created containing:
  - `bin`, `src`
  - Hidden files `.project` and `.classpath`
    - These files contain project metadata.
  - When moving projects to a different machine, these files will be used by Eclipse to identify directories containing projects
  - To import a project, select `File > Import > General > Existing Projects into Workspace` and choose the project directory

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4 Classes

4.1 Importing classes

Importing classes

To import external `.java` files, copy them to the clipboard under a file explorer and paste them into package view.

Task
Add the source files from your first assignment to the `src` directory of your new project; create packages when necessary.

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4.2 Class creation

Classes

- Use `File > New > Class`
- Introduce name, package, and, optionally, if you want an empty `main` method to be added

Task

- Create a new class, open it in the editor, and add an integer field. Type `/**` before the declaration of the attribute, hit *enter* and write the *javadoc* documentation.
- Create the class constructor and document it.
- In case your code contains errors, use the hints on the left edge of the code editor.

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5 Run

Run

- Since a particular project may include more than one class definition with a `main` method, the easiest way is to right-click on the class containing the `main` method to run and select `Run as > Java application`.
- This will create a new run configuration (menu `Run > Run configurations`), which can be edited to add command-line parameters to your program.

Task
A similar process may be performed at command-line:

- Open a terminal
- Move to the project directory
- Run `java -cp bin mains.Main` (Eclipse automatically compiles your source files and stores the resulting class files in directory `bin`). Replace `mains.Main` with the correct name if other.

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5.1 Debug

Debug

- Select `Run > Debug` (there is a button for this in the toolbar as well) to run your application in debug mode.
- To set a *breakpoint*, walk through the code and place your cursor on the marker bar (along the left edge of the editor area) on the line with the suspected code; double-click to set the breakpoint.
- Notice that Eclipse has switched to the *Debug* perspective.

Task
Run the `main` method line by line.

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6 Unit tests

JUnit

- Files containing unit tests will be under a different directory.
- Create a directory `test` in your project by right-clicking on the project name in package view and selecting `New > Source folder`
- Paste into *test* the files containing some tests used in the evaluation of the first assignment.
- Make your project use the JUnit framework (`Project / Properties / Java Build Path / Libraries / Add Library`).
- Run tests by right-clicking on the class name and choosing `Run as > JUnit test`

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JUnit

Task

- Open the source file with the tests.
  - It contains a number of methods with annotations like `@Before` (for test configuration) and `@Test` (for code verification).
  - `assertEquals` checks whether expected and current value match. Parameters are: title (optional), expected value, current value, absolute value of the difference allowed (optional; useful for real numbers) .
- Run a pass with no errors and one where some assertion does not hold. To detect the source of the issue, select panel `Failure trace`.

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New unit test

To create a new unit test for a class, right-click on its name and select `New > JUnit test case`.

- Choose JUnit 4
- Type `test` (instead of `src`) in the directory field.

Task

- Write a new unit test for your new class which tests its constructor.
- To run all the tests, right-click on the project name and select `Run as > JUnit test`

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7 Code generation

Code generation

- Implementation of some operations (e.g., `equals` or `toString`) is usually routine.
- Eclipse can write some draft excerpts of code for you; right-click on the source file and select `Source > Generate toString()` and `Source > Generate hashCode and equals()`.

Task
Automatically generate these methods for your new class.