שיטות הנדסיות לפיתוח מערכות תוכנה

GitHub

Intro

- מה זה git?
- מה זה gitHub?
- מה ההבדלים?

Intro

- Git : היא מערכת ניהול גרסאות מבוססת קוד פתוח, שמטרתה לסייע למפתחים בניהול קוד, תיאום עבודה צוותי ומעקב אחר שינויים בקובצי תוכנה.
- מטרותיה העיקריות הן לספק מהירות, שלמות מידע ותמיכה בתהליכים מבוזרים ולא ליניאריים.
- כמערכת בקרת גרסאות מבוזרת, כל ספרייה שלה בכל מחשב נחשבת למאגר נתונים עם תיעוד מלא ואפשרויות מעקב אחר שינויי גרסה, ללא תלות בגישה לרשת או בשרת מרכזי.

Intro

- תשימו לב : GitHub ו Git זה לא אותו הדבר.Git הוא open-source, version control tool, לעומת GitHub שנותנת לנו כלים אשר ניתן לבצע אינטגרציה עם Git.
- אין לנו צורך ב GitHub על מנת להשתמש ב Git, אבל לא ניתן להשתמש ב GitHub ללא Git.
  אנחנו צריכים את GitHub ל ,"remotes" as git-speak.

About repositories

- A repository contains all of your project's files and each file's revision history.
- You can discuss and manage your project's work within the repository.
- You can own repositories individually, or you can share ownership of repositories with other people.
- In Git You can restrict who has access to a repository by choosing the repository's visibility.

About repositories

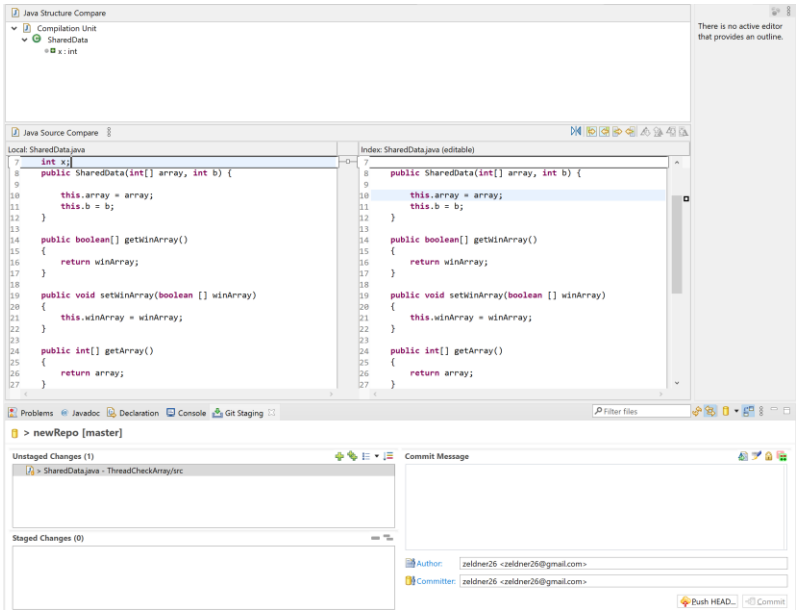
- For user-owned repositories, you can give other people collaborator access so that they can collaborate on your project.
- If a repository is owned by an organization, you can give organization members access permissions to collaborate on your repository.
- With GitHub Free for user accounts and organizations, you can work with unlimited collaborators on unlimited public repositories with a full feature set, or unlimited private repositories with a limited feature set.

About repositories

- You can use repositories to manage your work and collaborate with others.
  - You can use **issues** to collect user feedback, report software bugs, and organize tasks you'd like to accomplish.
  - You can use **discussions** to ask and answer questions, share information, make announcements, and conduct or participate in conversations about a project.
  - You can use **pull** requests to propose changes to a repository.
  - You can use **project boards** to organize and prioritize your issues and pull requests.

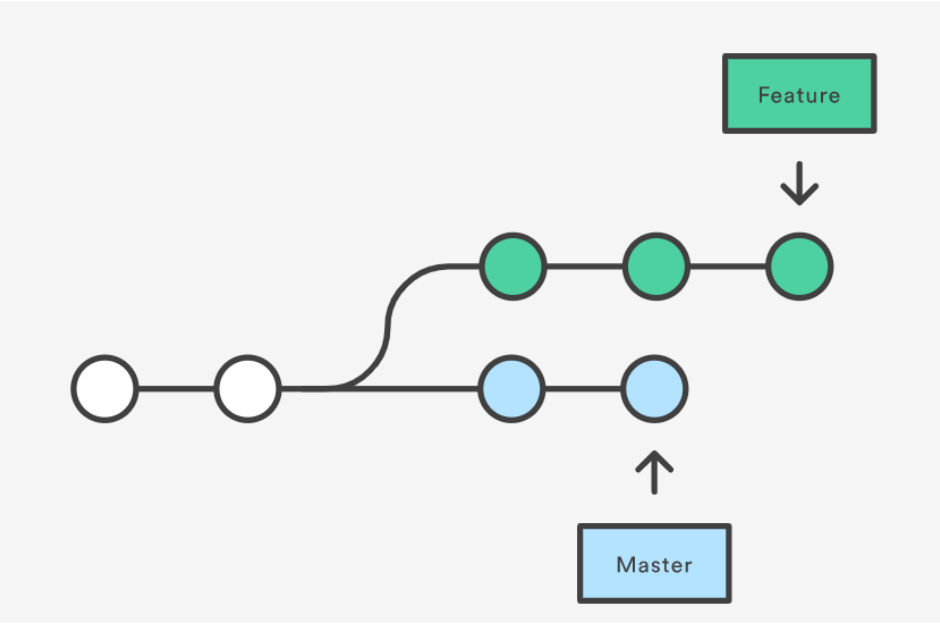
Merging vs. Rebasing

- Both of these commands are designed to integrate changes from one branch into another branch—they just do it in **very different ways**.
- Consider what happens when you start working on a new feature in a dedicated branch, then another team member updates the master branch with new commits.



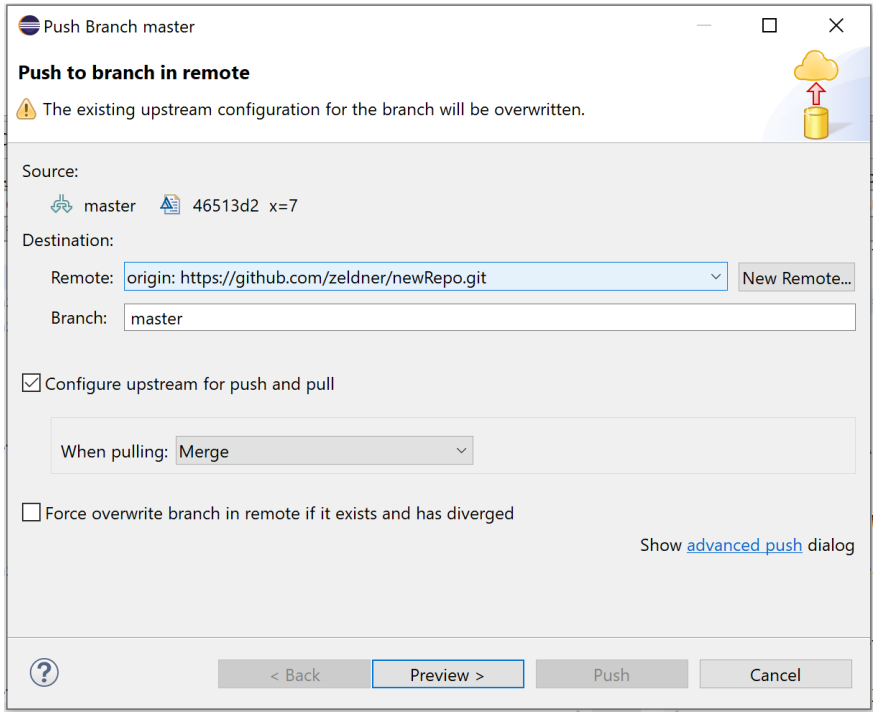
Merging vs. Rebasing

- Now, let's say that the new commits in **master** are relevant to the feature that you're working on.
- To incorporate the new commits into your feature branch, you have two options: **merging or rebasing**.



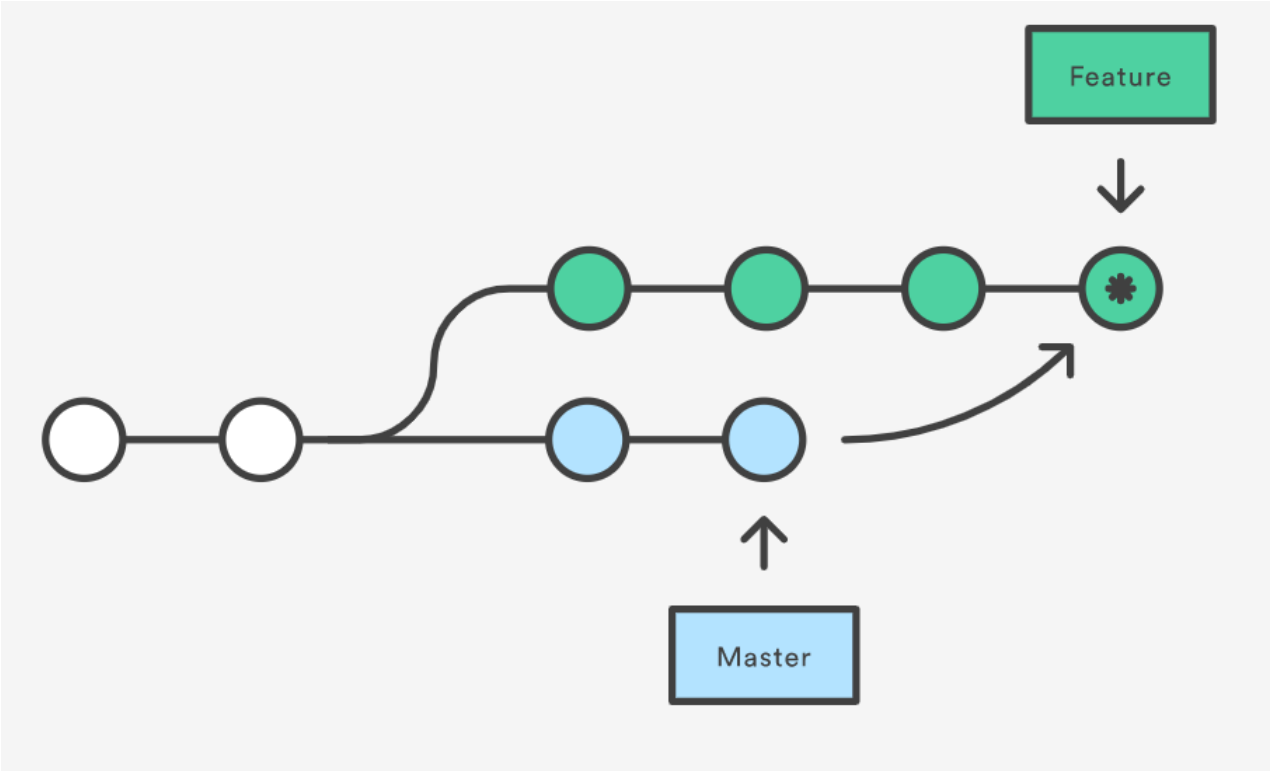
The Merge Option

- The easiest option is to merge the master branch into the feature branch.
- For example :



Merging vs. Rebasing

- This creates a new **merge commit** in the feature branch that ties together the histories of both branches, giving you a branch structure that looks like this:

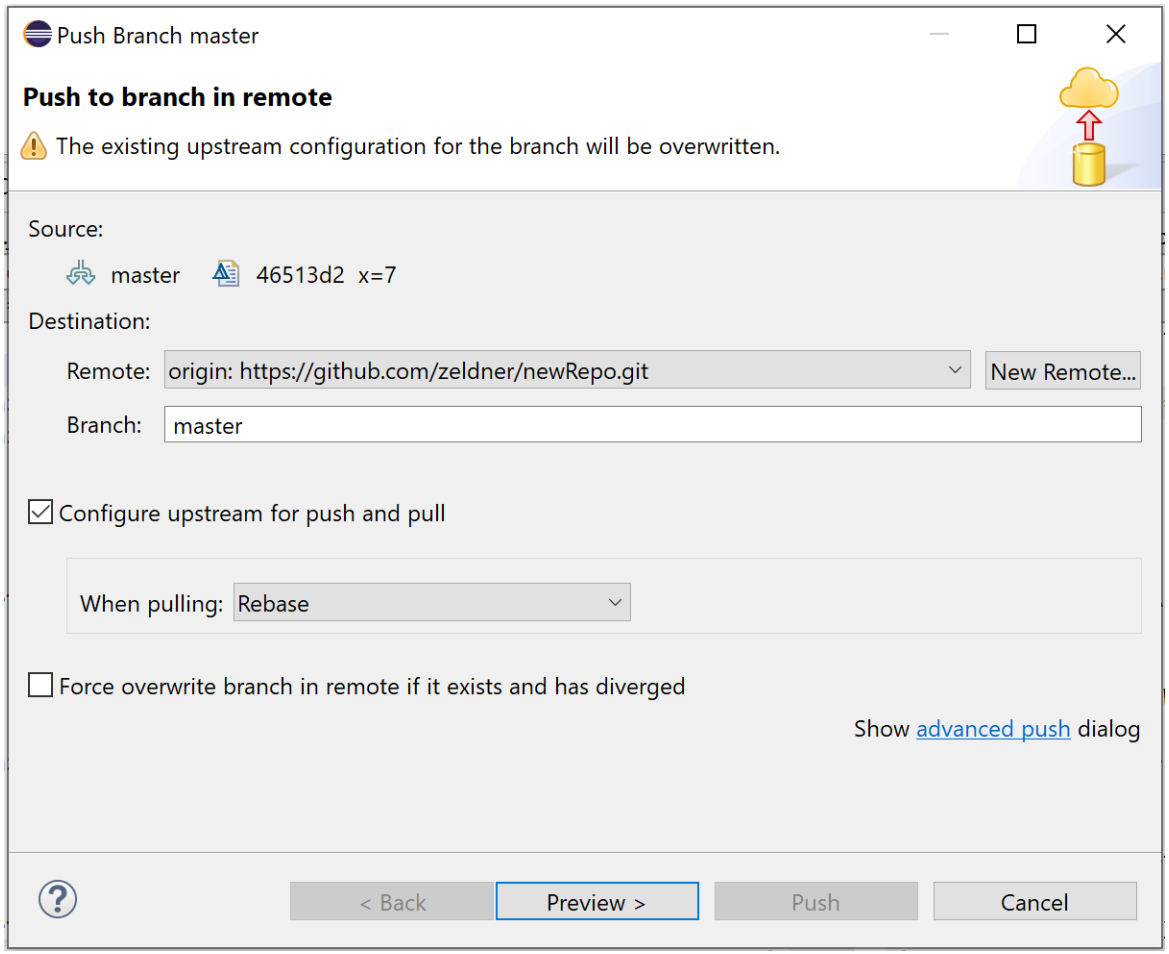


Merging vs. Rebasing

- The existing branches are not changed in any way.
- This avoids all of the potential pitfalls of rebasing.
- On the other hand, this also means that the feature branch will have an extraneous merge commit every time you need to incorporate upstream changes.
- If master is very active, this can pollute your feature branch's history quite a bit.
- While it's possible to mitigate this issue with advanced git log options, it can make it hard for other developers to understand the history of the project.

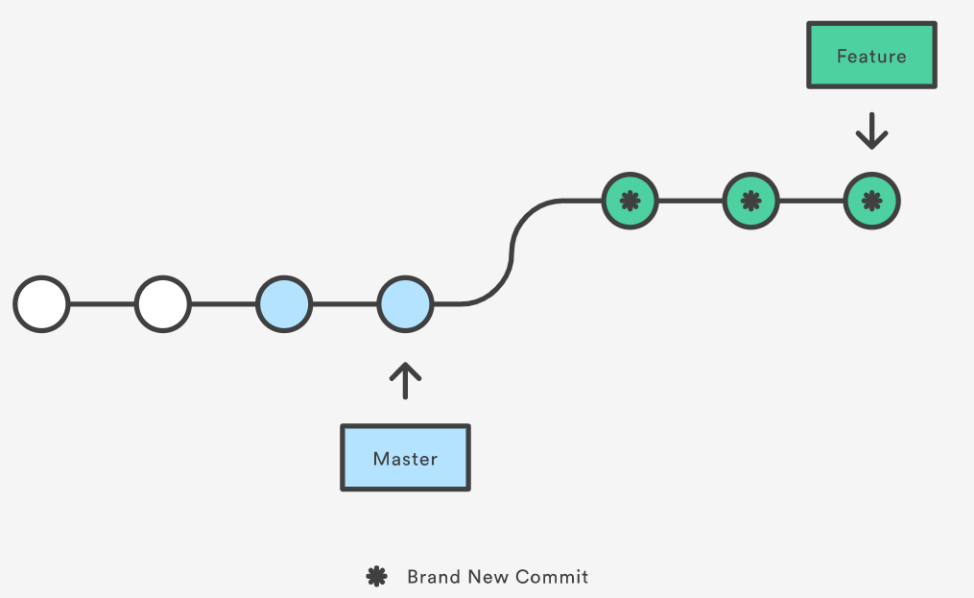
The Rebase Option

- As an alternative to merging, you can rebase the feature branch onto master branch.
- For example :



The Rebase Option

- This moves the entire feature branch to begin on the tip of the master branch, effectively incorporating all of the new commits in master.
- But, instead of using a merge commit, rebasing *re-writes* the project history by creating brand new commits for each commit in the original branch.

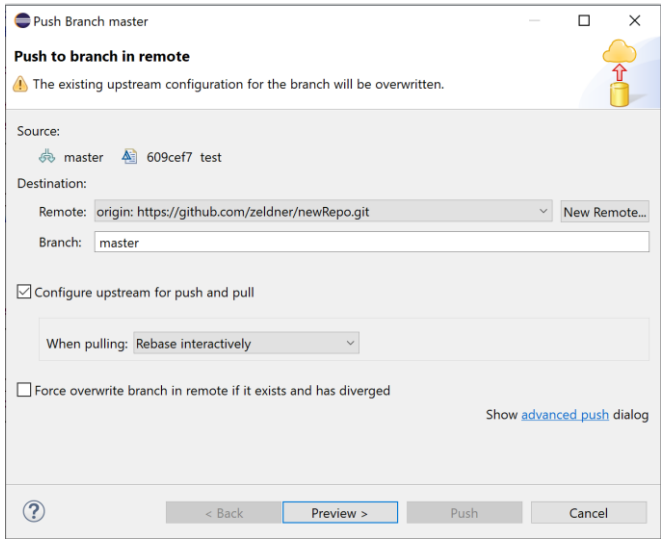


The Rebase Option

- The major benefit of rebasing is that you get a much cleaner project history.
- First, it eliminates the unnecessary merge commits required by git merge.
- Second, rebasing also results in a perfectly linear project history—you can follow the tip of feature all the way to the beginning of the project without any forks.
- This makes it easier to navigate your project with commands.
- But, there are two trade-offs for this pristine commit history: safety and traceability.

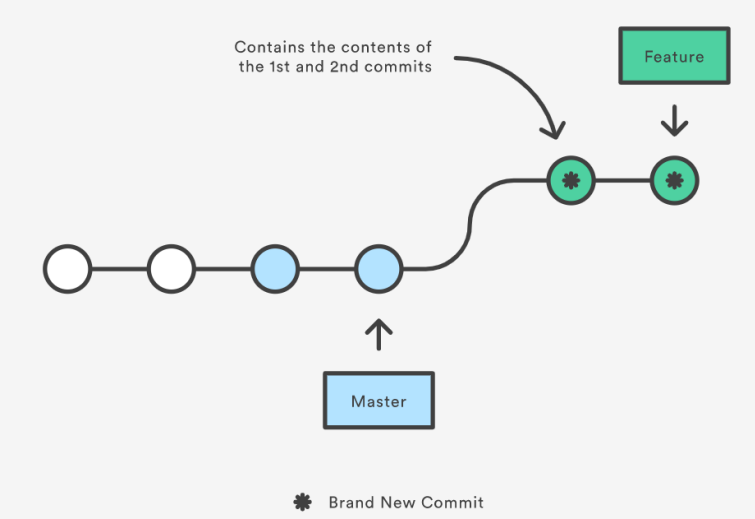
Interactive Rebasing

- Interactive rebasing gives you the opportunity to alter commits as they are moved to the new branch.
- This is even more powerful than an automated rebase, since it offers complete control over the branch's commit history.
- Typically, this is used to clean up a messy history before merging a feature branch into master.



Interactive Rebasing

- Git will perform the rebase according to your instructions, resulting in project history that looks like the following:



- Eliminating insignificant commits like this makes your feature's history much easier to understand.

Getting started

- ראשית יש להרשם באתר של gitHub:
- https://github.com/
- מתקינים gitHub ו git באקליפס על פי קובץ ההוראות התקנה.

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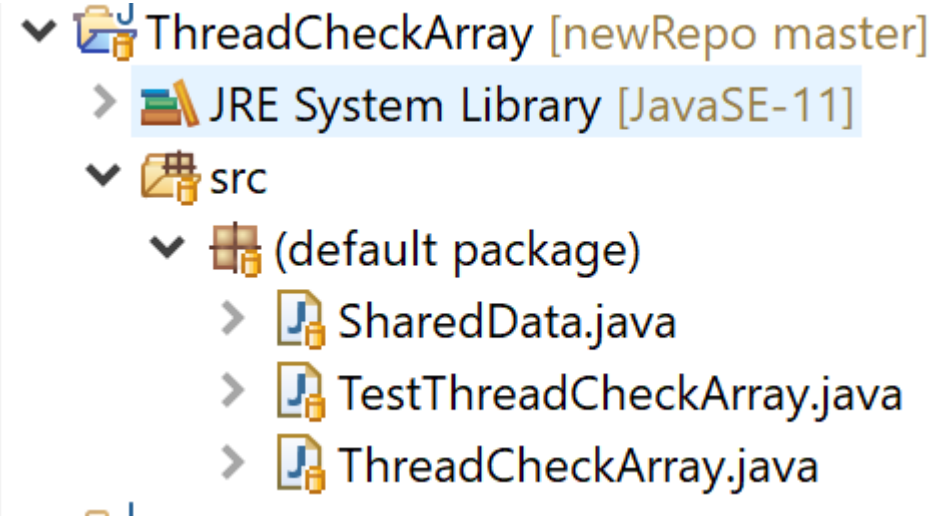
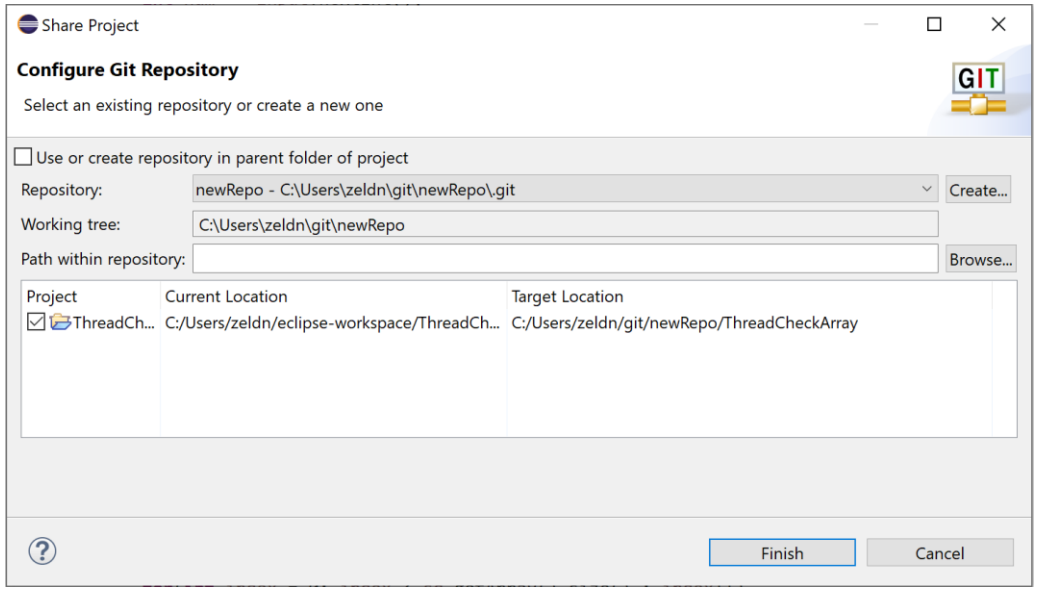


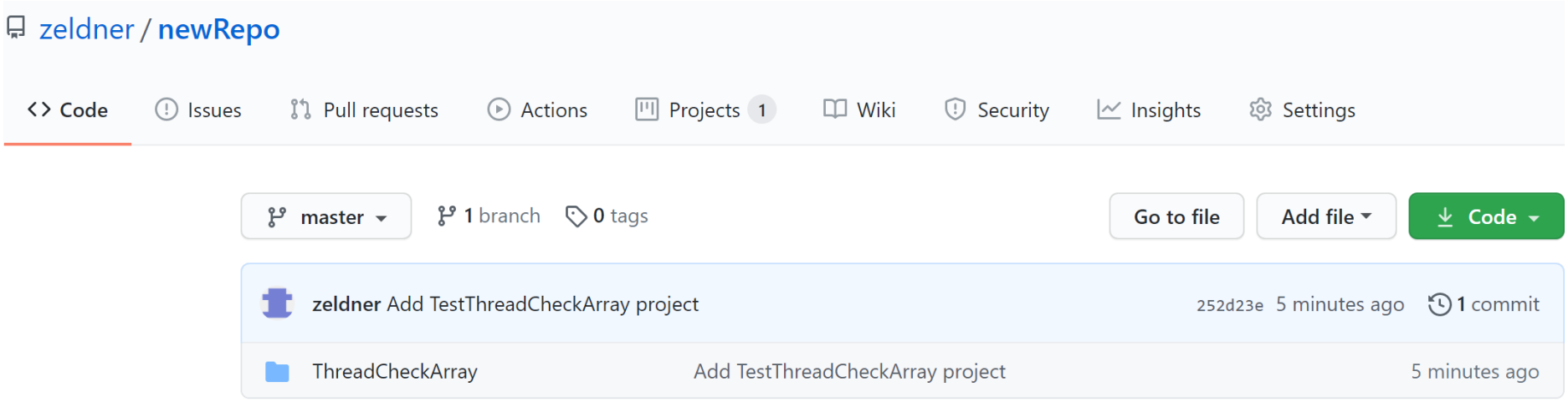
Pushing project to GitHub in Eclipse

- מעלים את הפרויקט TestThreadCheckArray כך :
  - Team > Share Project
  - Copy http URL from GitHub
  - For example :



Pushing project to GitHub in Eclipse

- אחרי שהעלנו ל Git , נבצע על הפרויקט :
  - Team > Commit
  - Add to index project and Commit and Push to initialize a new Git repository.
  - For example :



JavaDoc

JavaDoc

- ✓ Javadoc is a tool that generates html documentation (similar to the reference pages at java.sun.com) from Javadoc comments in the code.
- ✓ In this tutorial we will go over how to write basic Javadoc comments and how to use features of Javadoc to generate html documentation.

JavaDoc Comments

- ✓ Javadoc recognizes special comments **/** .... */** which are highlighted blue by default in Eclipse (regular comments **//** and **/* ... */** are highlighted green).
- ✓ Javadoc allows you to attach descriptions to classes, constructors, fields, interfaces and methods in the generated html documentation by placing Javadoc comments directly before their declaration statements.

JavaDoc Comments

- ✓ Here's an example using Javadoc comments to describe a class, a field and a constructor:

```
/** Class Description of MyClass */
public class MyClass
{
  /** Field Description of myIntField */
  public int myIntField;
  /** Constructor Description of MyClass() */
  public MyClass()
  {
          // Do something ...
  }
}
```

JavaDoc Tags

- ✓ **Tags** are keywords recognized by Javadoc which define the type of information that follows.
- ✓ Tags come after the description (separated by a new line).

JavaDoc Tags

Here are some common pre-defined tags:

- ✓ ***@author [author name]*** - identifies author(s) of a class or interface.
- ✓ ***@version [version]*** - version info of a class or interface.
- ✓ ***@param [argument name] [argument description]*** - describes an argument of method or constructor.
- ✓ ***@return [description of return]*** - describes data returned by method (unnecessary for constructors and void methods).
- ✓ ***@exception [exception thrown] [exception description]*** - describes exception thrown by method.
- ✓ ***@throws [exception thrown] [exception description]*** - same as ***@exception***.

JavaDoc Tags

Here's an example with tags:

```
/** Description of MyClass
 * @author John Doe
 * @author Jane Doe
 * @version 6.0z Build 9000 Jan 3, 1970.
 */
public class MyClass
{
  /** Description of myIntField */
  public int myIntField;
  /** Description of MyClass()
   *
   * @throws MyException                Description of myException
   */
  public MyClass() throws myException
  {
          // Blah Blah Blah...
  }

  /** Description of myMethod(int a, String b)
   *
   * @param a                    Description of a
   * @param b                    Description of b
   * @return                     Description of c
   */
  public Object myMethod(int a, String b)
  {
          Object c;
          // Blah Blah Blah...
          return c;
  }
}
```

JavaDoc In Eclipse

Eclipse can generate Javadoc comments for classes and methods.

1. Place the cursor in the text of class of method declaration.
2. Right Click->Source->Add Javadoc Comment.
3. Javadoc comments with appropriate tags are generated, but you still have to write the descriptions.

JavaDoc In Eclipse

Eclipse can also compile Javadocs for projects/packages/classes in the workspace.

✓ Set location of Javadoc command and export your project/package/class as a Javadoc:

1. ***File->Export***.
2. Select ***Javadoc*** and enter the path of ***Javadoc.exe***, i.e. ***[Path of J2SE 1.5 SDK]\bin\javadoc.exe*** (e.g. ***c:\j2sdk1.5.0\bin\javadoc.exe***).
3. Also choose your export destination and click ***Next***.
4. In the ***Generate Javadoc Windo***w, select the project/package(s)/class(es) you want to compile Javadocs for, select the visibility, and enter the path of the destination folder.
5. Click ***Finish***.

מטלת כיתה

מטלת כיתה

- עליכם לקרוא את הקובץ **Threadq.doc** אשר מסביר את הבעיה ואת הפתרון **TestThreadCheckArray** .
- עליכם לשנות את הפתרון, כל שבמקום **int[] array;**, הנתונים יהיו ב **ArrayList<Integer> array;**
- 2 אנשי הצוות יורידו מה Github את הפרויקט ל Git באקליפס שלהם (כל אחד למחשב שלו)
- על אחד מכם לעדכן את הפרויקט בקובץ TestThreadCheckArray ולהעלות את התוצאה לGitHub.
- על השותף השני לעדכן את הקבצים SharedData ו ThreadCheckArray ולהעלות את התוצאה לGitHub.
- בסיום (לאחר איחוד), על אחד מכם להריץ את הפרויקט ולבדוק שהוא רץ ונותן תוצאה נכונה.

מטלת כיתה

- עליכם לתעד על פי ההסברים של Javadoc command : באקליפס בוחרים : **generate element comment**.
- התיעוד יהיה על כל מחלקה וכל פונקציה בפתרון של **TestThreadCheckArray**
- תעשו יצוא ל javadoc לפרויקט, כמו שהוסבר במצגת.

- **בהצלחה!!!**

<u>הסבר קצר לפתרון שהורדתם :</u>

התוכנית מראה , איך בעזרת שני threads ניתן לבצע את 2 הבדיקות על האיבר a_{n-1} (והוא בלבד) במקביל כאשר:

- הראשון שמוצא פתרון מדווח ל-thread השני שפתרון נמצא.
- כל thread בודק אם ה-thread השני מצא פתרון בכל ביצוע של קריאה רקורסיבית.
- כאשר thread מוצא פתרון הוא מדווח דרך מערך שלם או בוליאני chosen מיהם האיברים שנמצאים בפתרון.
- מהרגע שאחד ה-threads מוצא פתרון ומתחיל לרשום אותו ה-thread השני לא ירשום גם הוא על הפתרון.

הפתרון מסתמך על כך , שיתבצעו שני threads בדיוק.