Advanced Software Development: Git Workflows

CPSC 233: Introduction to Computer Science for Computer Science Majors II
Winter 2025

Slides via Steve Sutcliffe

Jonathan Hudson, Ph.D.
Assistant Professor (Teaching)
Department of Computer Science
University of Calgary

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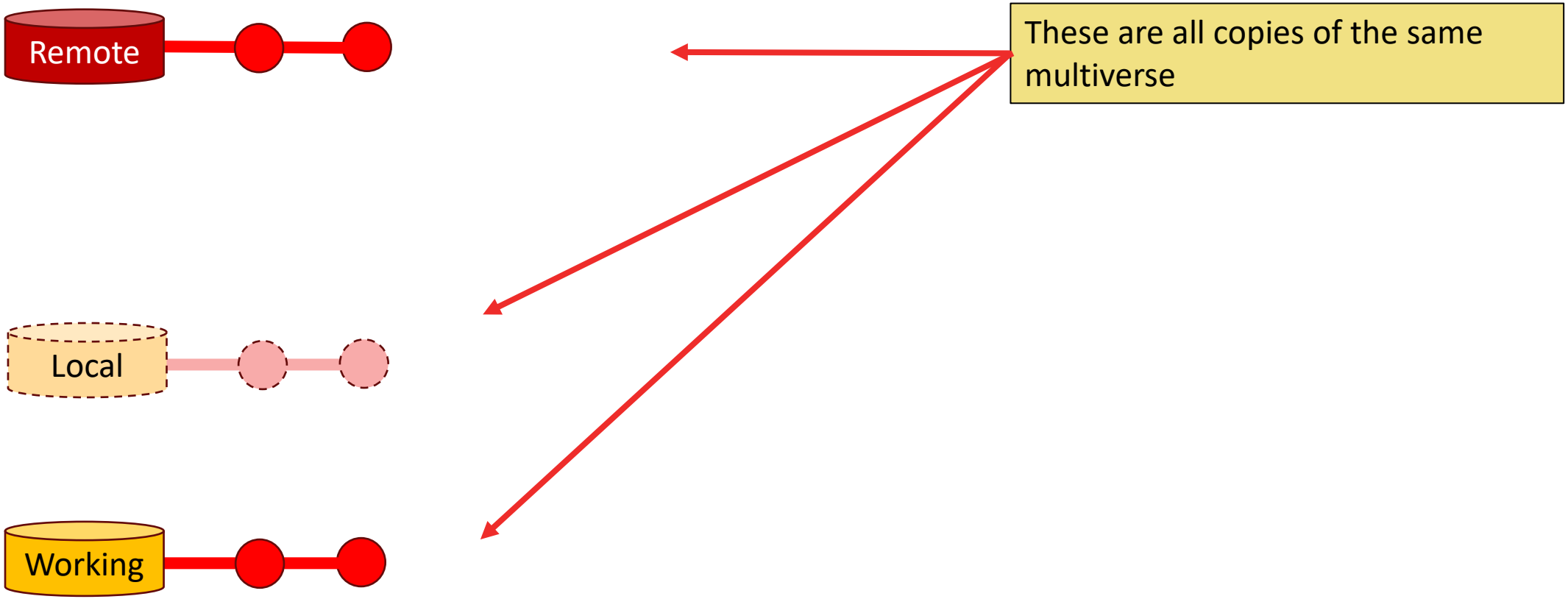
Workflow: the three realms



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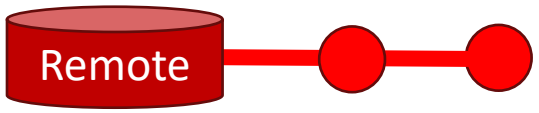
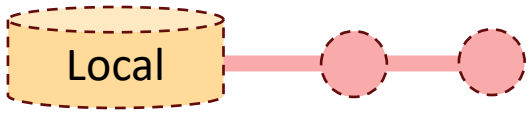
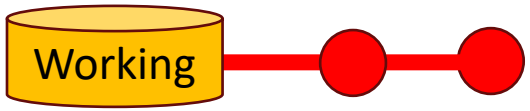
Workflow: the three realms



This is the version the world sees; all magicians have access to this one

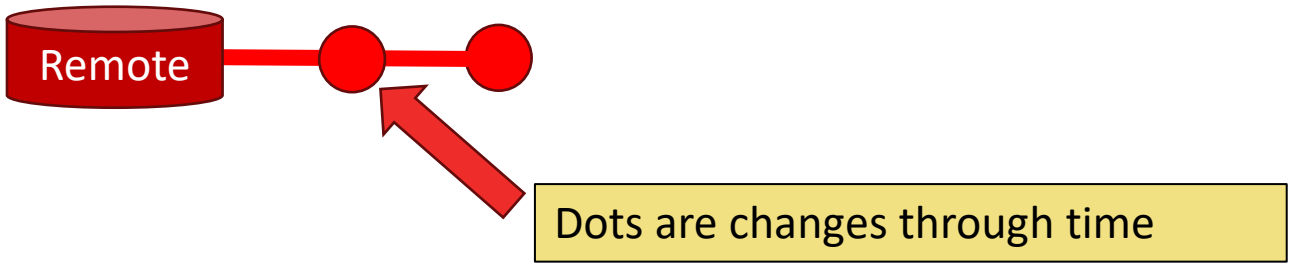


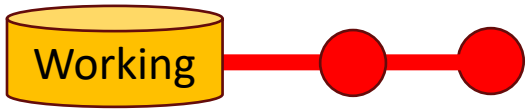
This is the version only Barry has access to, it is **git's local copy** of the "remote", it is invisible to Barry.



This is the version Barry works on

Workflow: the three realms

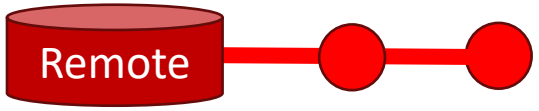


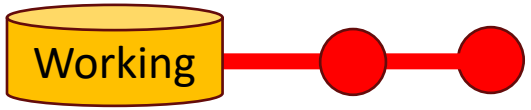


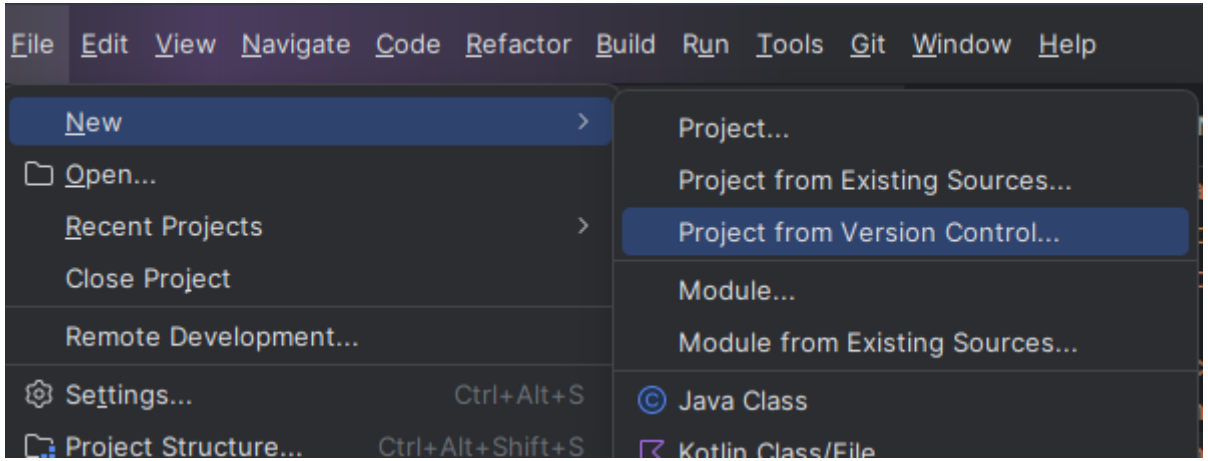
Solo Work

Clone

Workflow: Clone the Repo



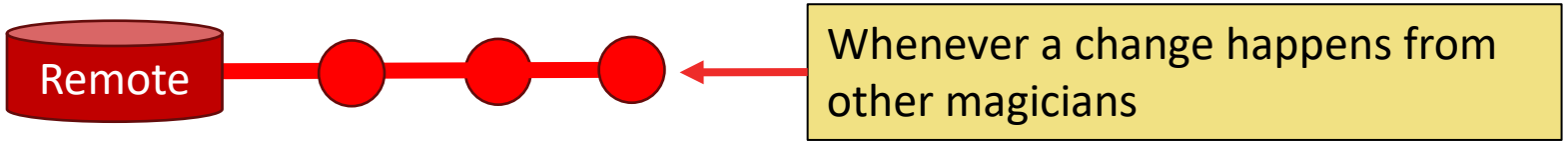


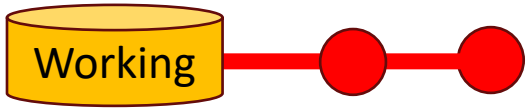


Barry creates this when he clones the repo down to his local machine

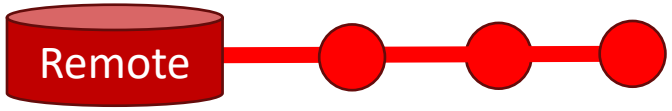
Pull

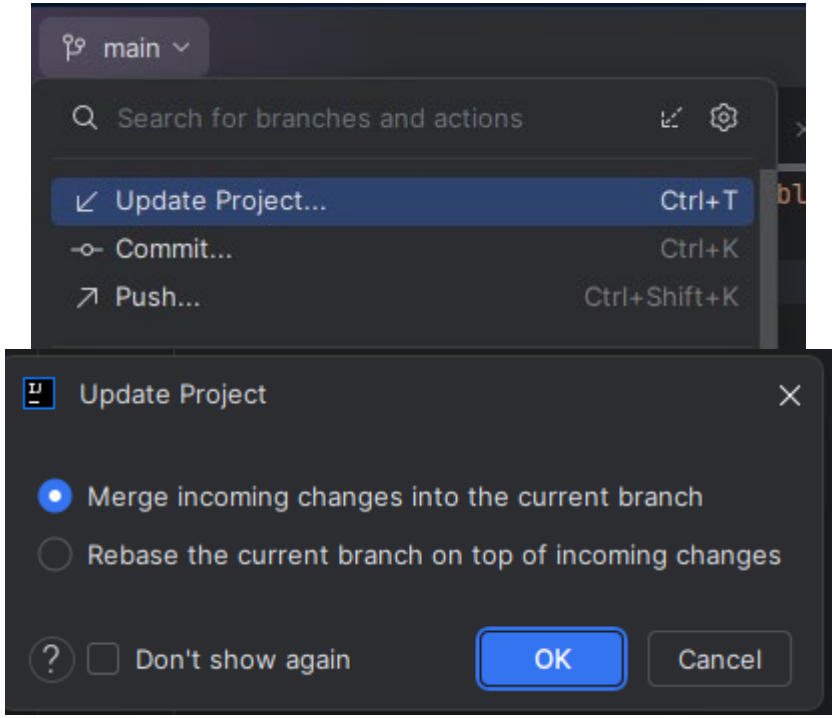
Workflow: pull (update in intellij)

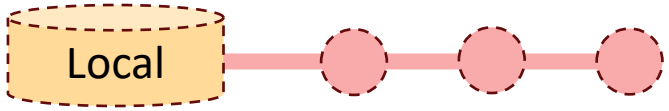




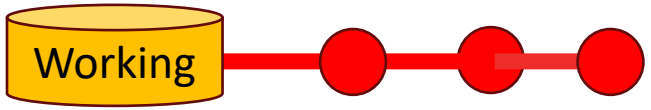
Workflow: pull (update in intellij)







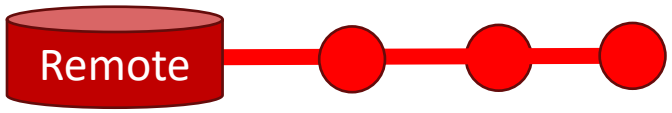
Barry must update his version by pulling those changes from the remote

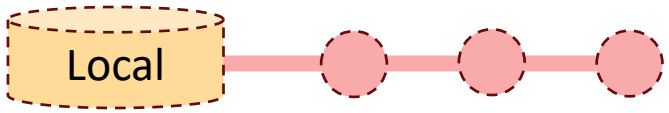


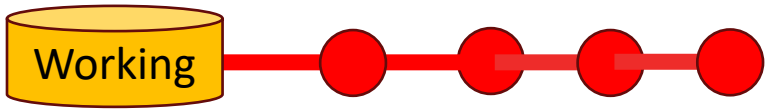
That ‘pull’ updates the area where Barry works.

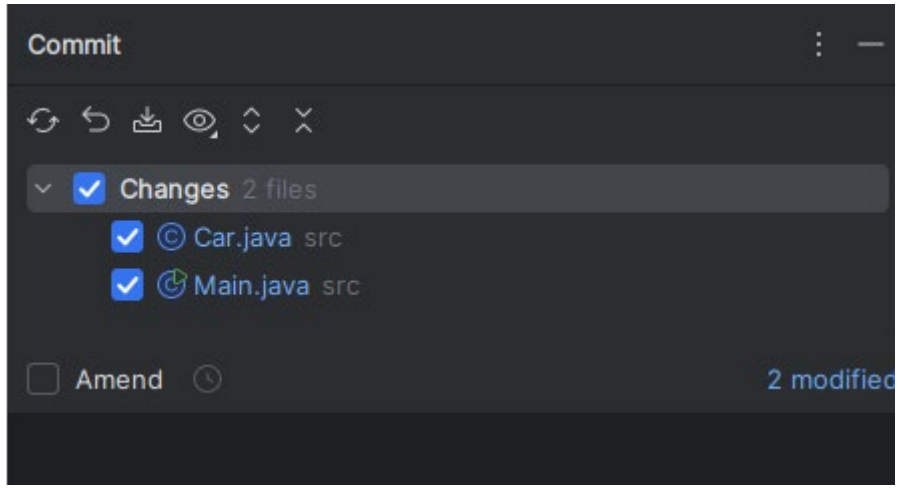
Work

Workflow: add (checkboxes in intellij)









When Barry does something, a change in time happens only for his working

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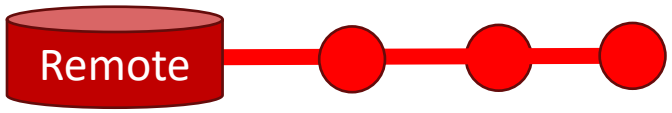
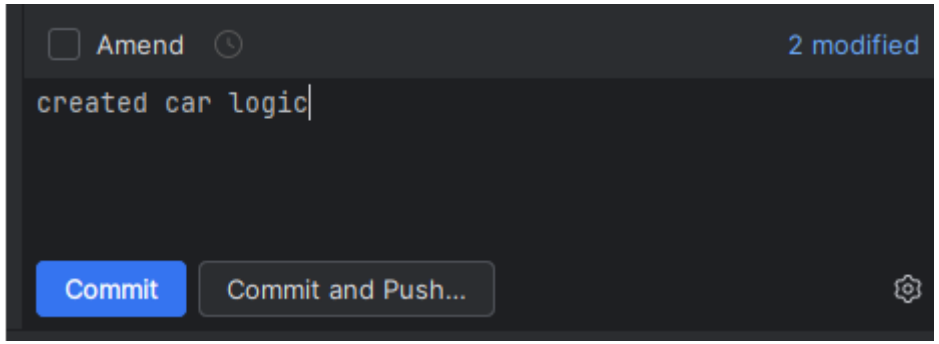
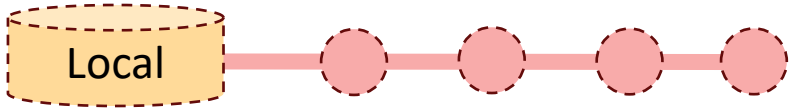
Save

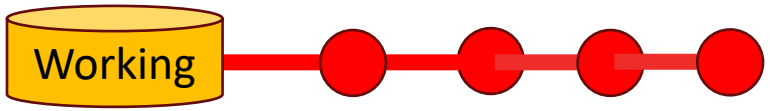
Workflow: Commit





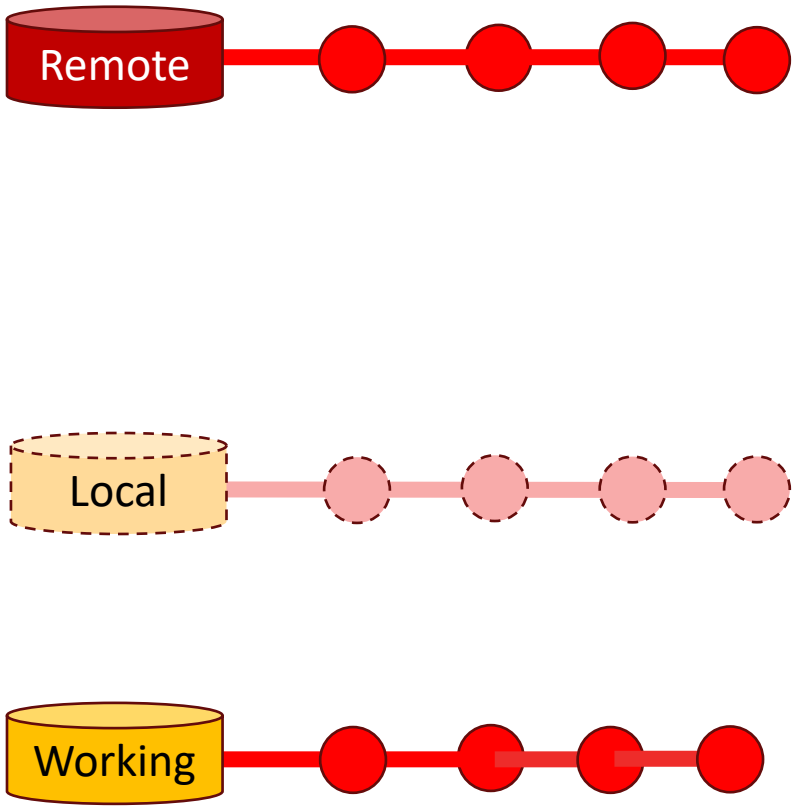


If Barry is happy with that change, he needs to commit to it

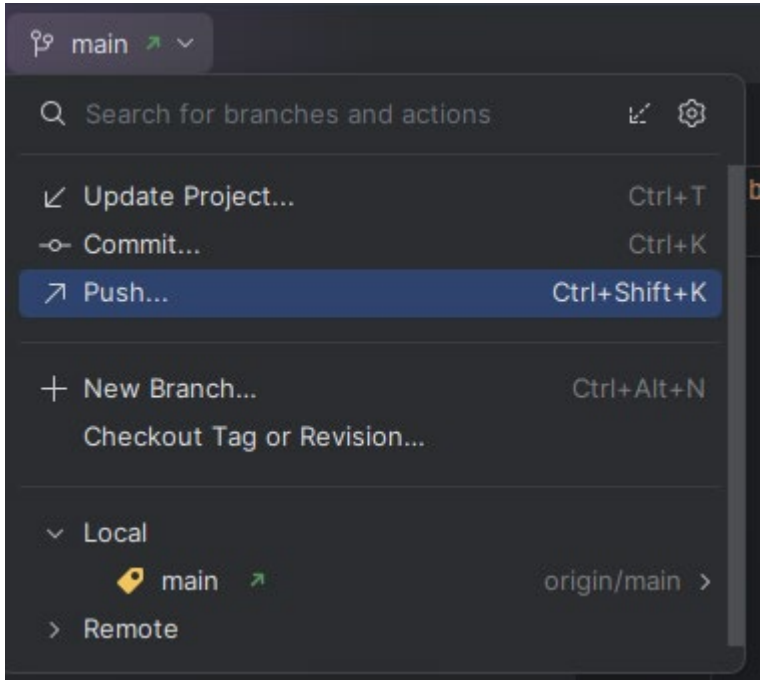


Push

Workflow: Push



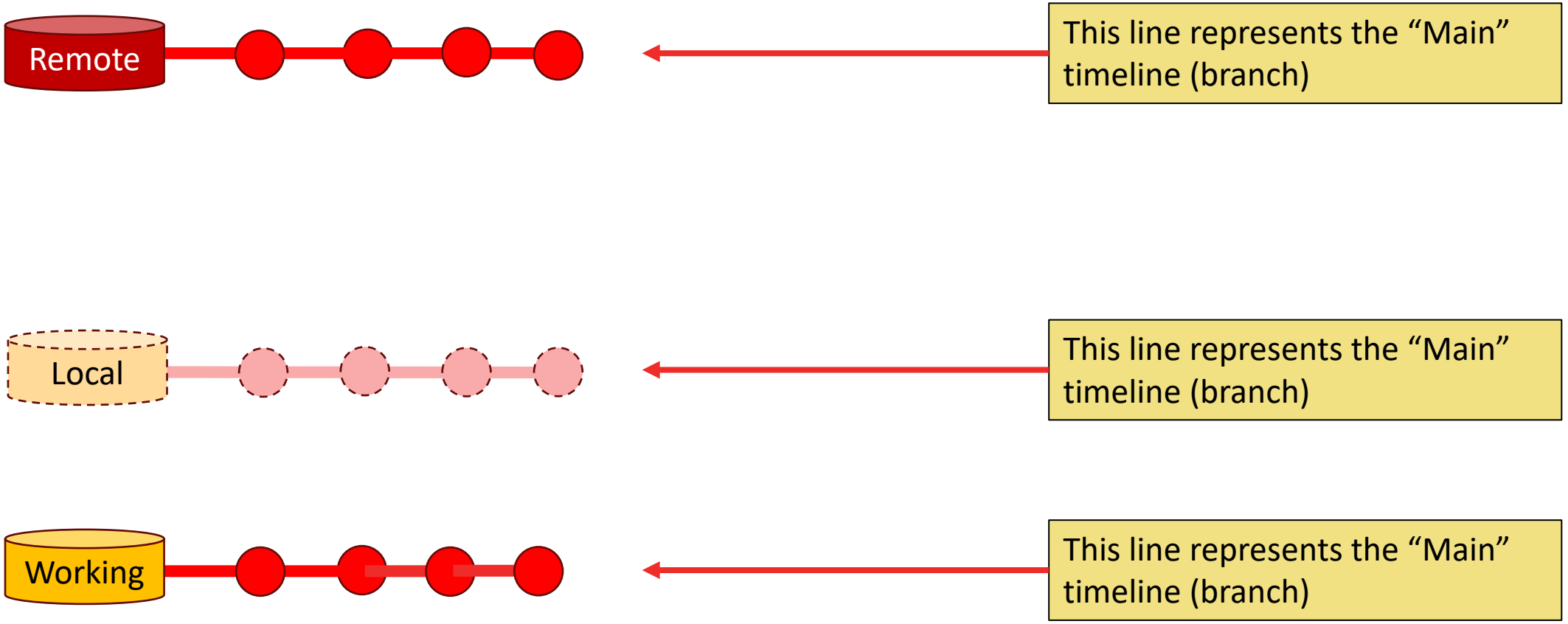
If Barry wants to share that change with other magicians, he must push those changes to the world



Branches

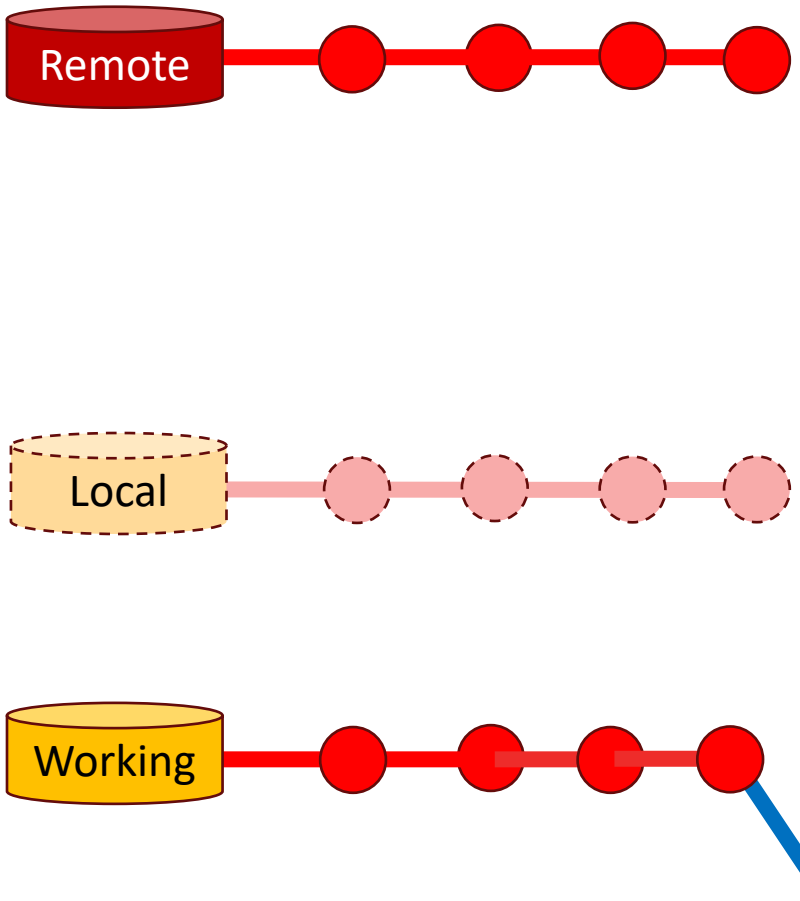
Main

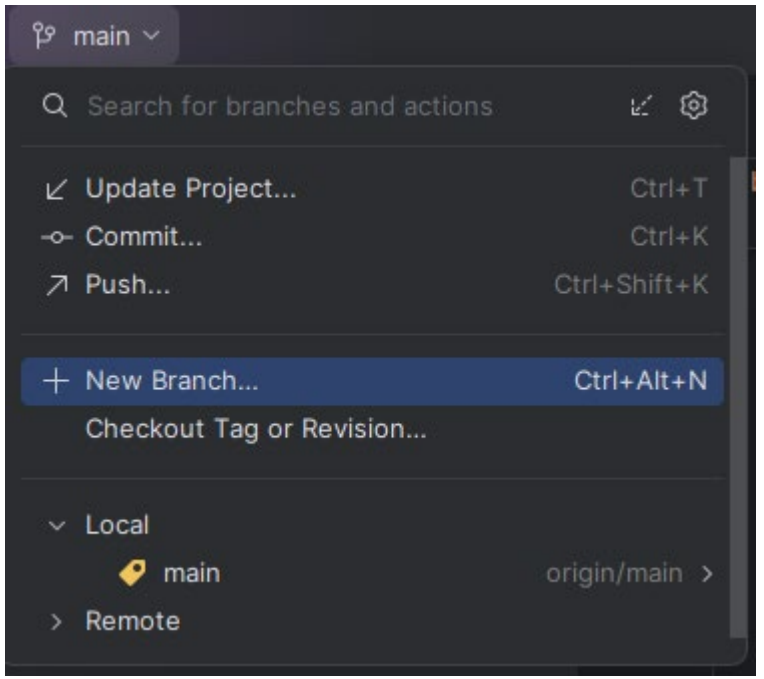
Workflow: Branches -1-



They are just different areas for working on the main timeline

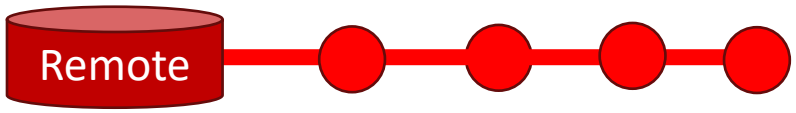
Workflow: Branches -2-

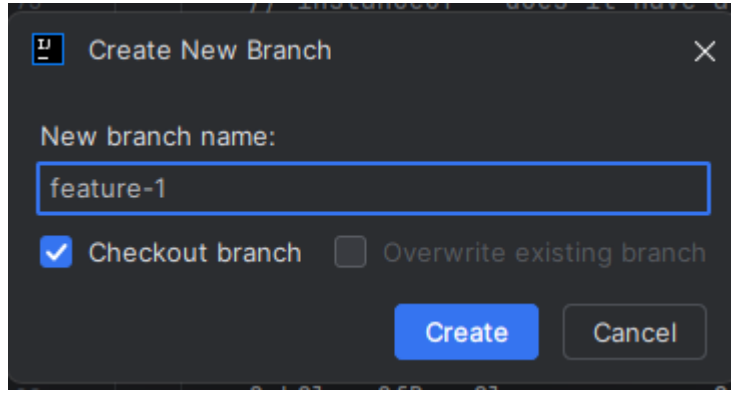


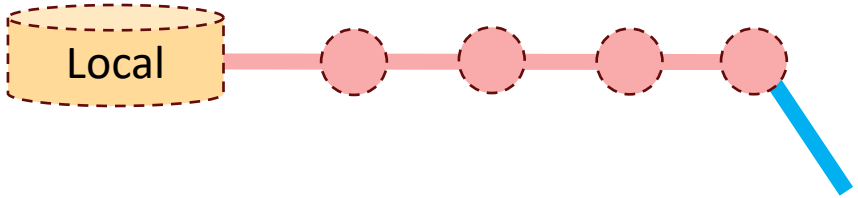


If Barry wants to experiment, he creates a new timeline (branch)

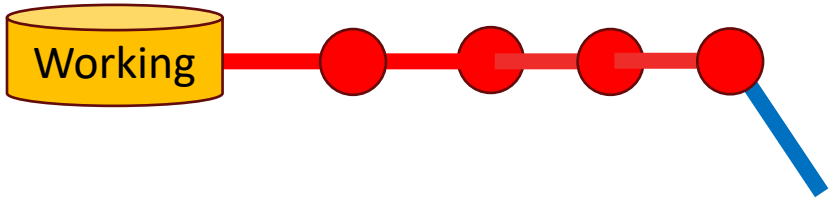
Workflow: Branches -2-



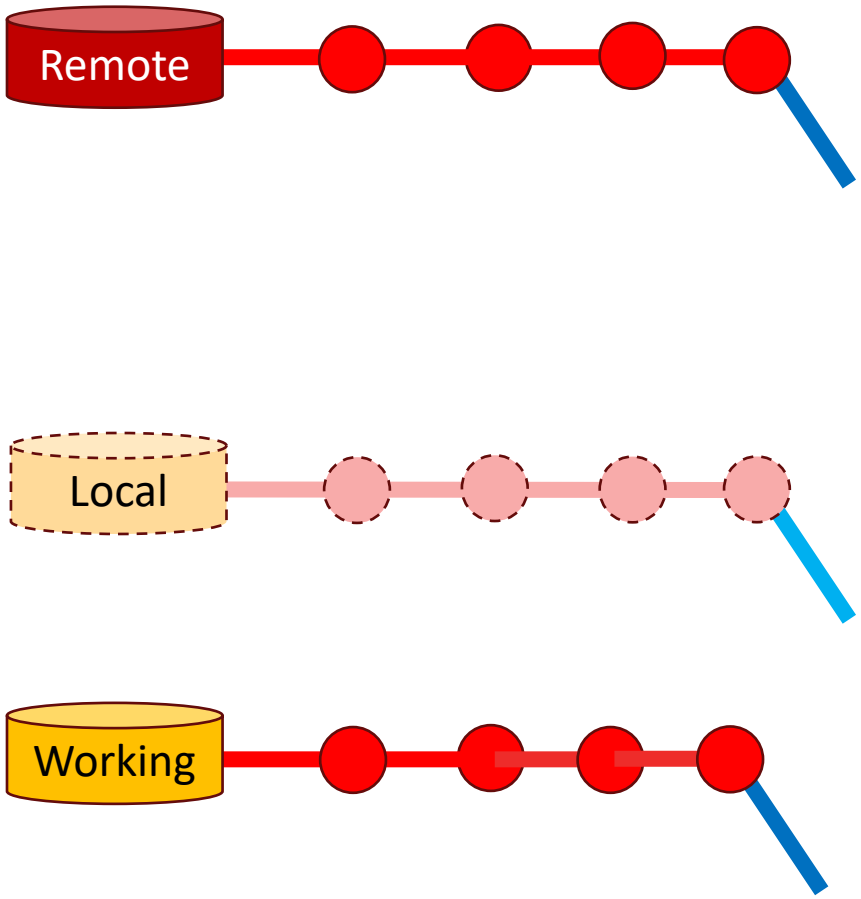




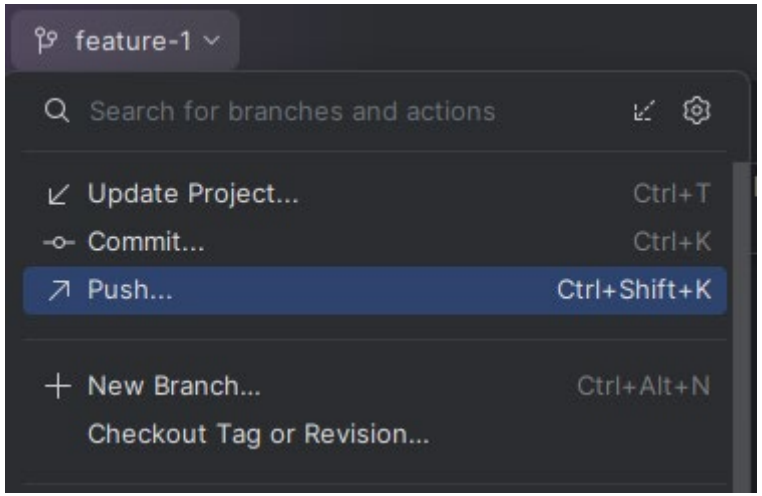
Barry's copy of the multiverse is automatically updated



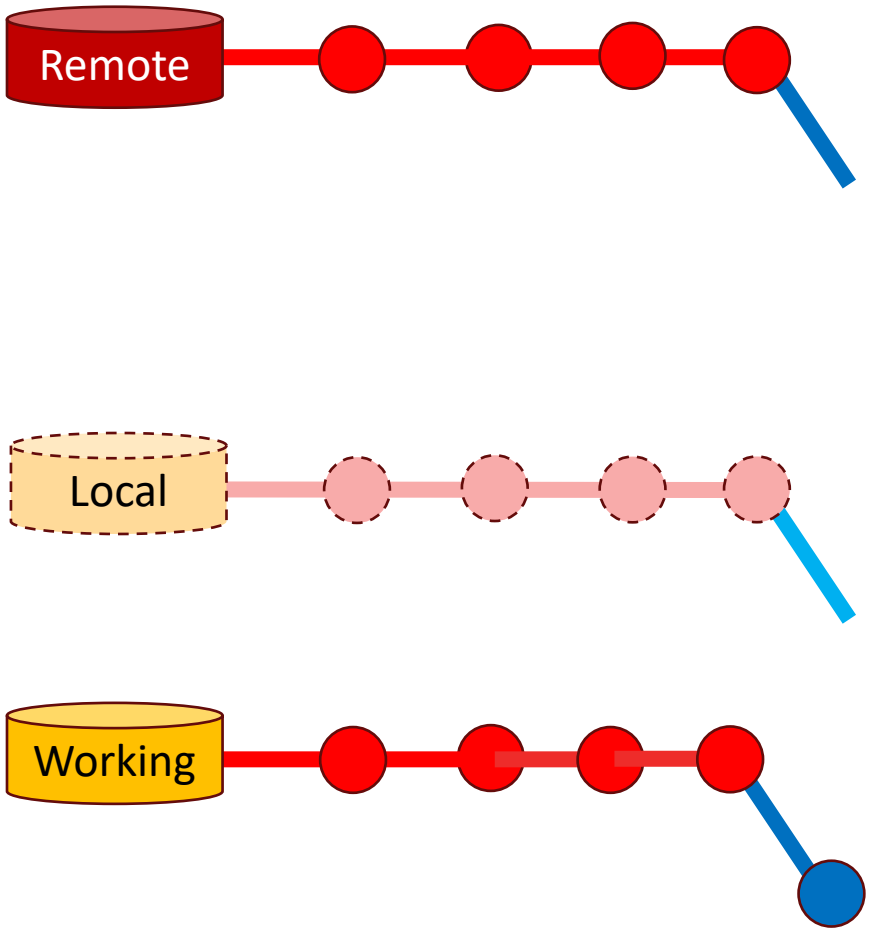
Workflow: Branches -2- (push in intellij)

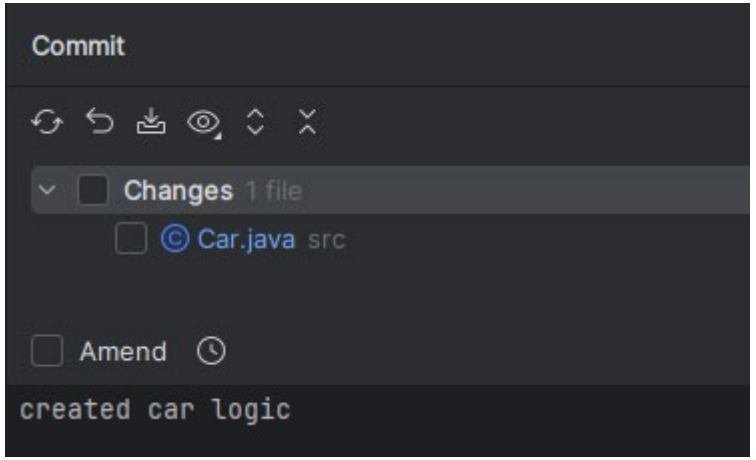


But if Barry wants other magicians to see this branching timeline, he must set the upstream



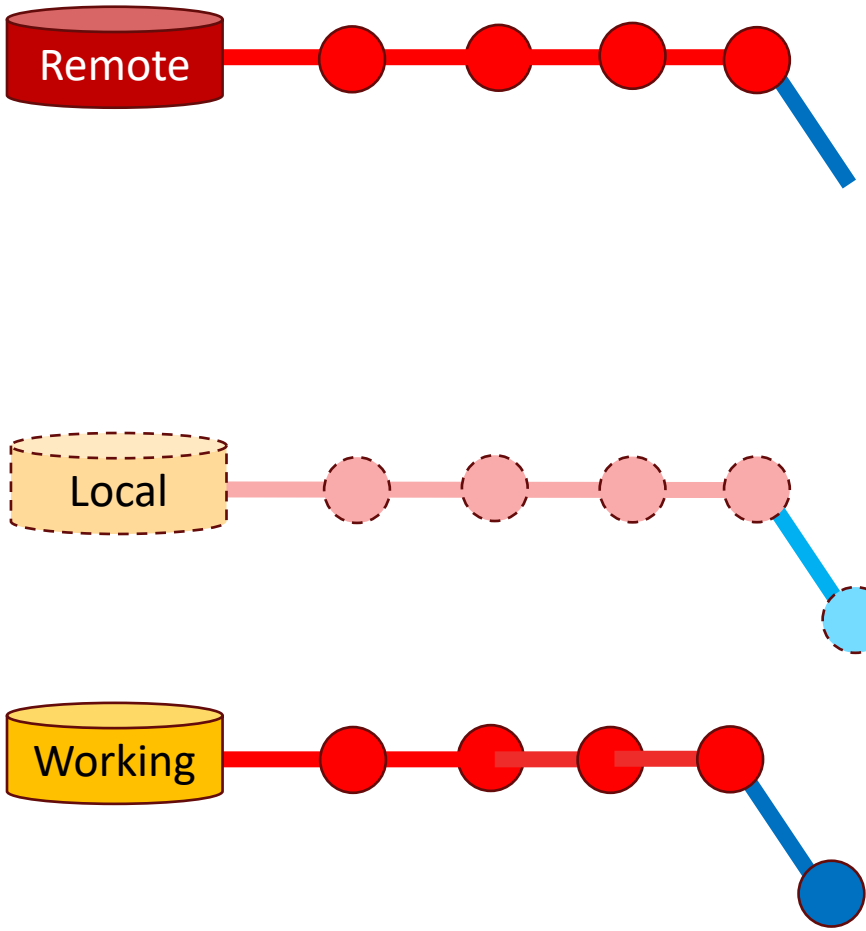
Workflow: Branches -3-

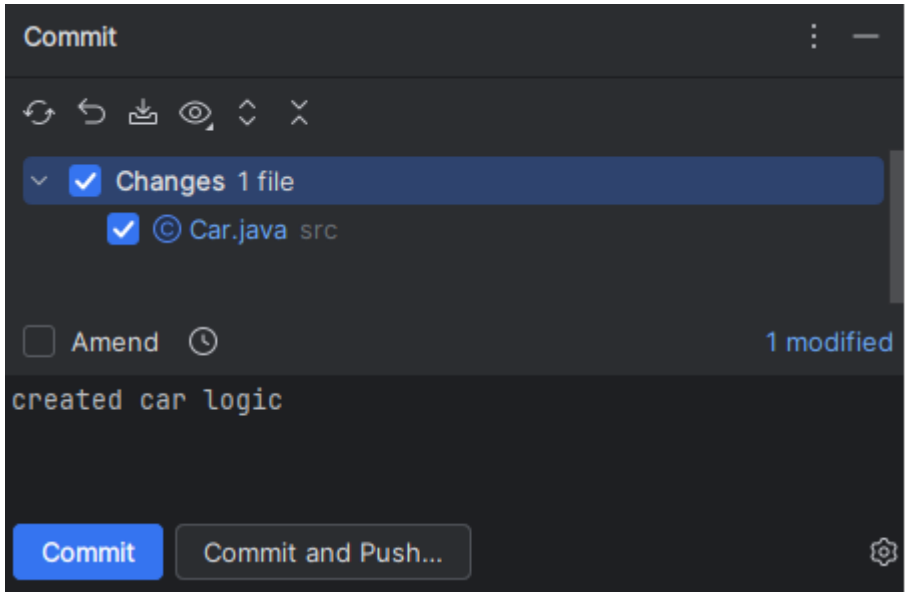




Now when Barry does something, it only effects this new branch, in the working area

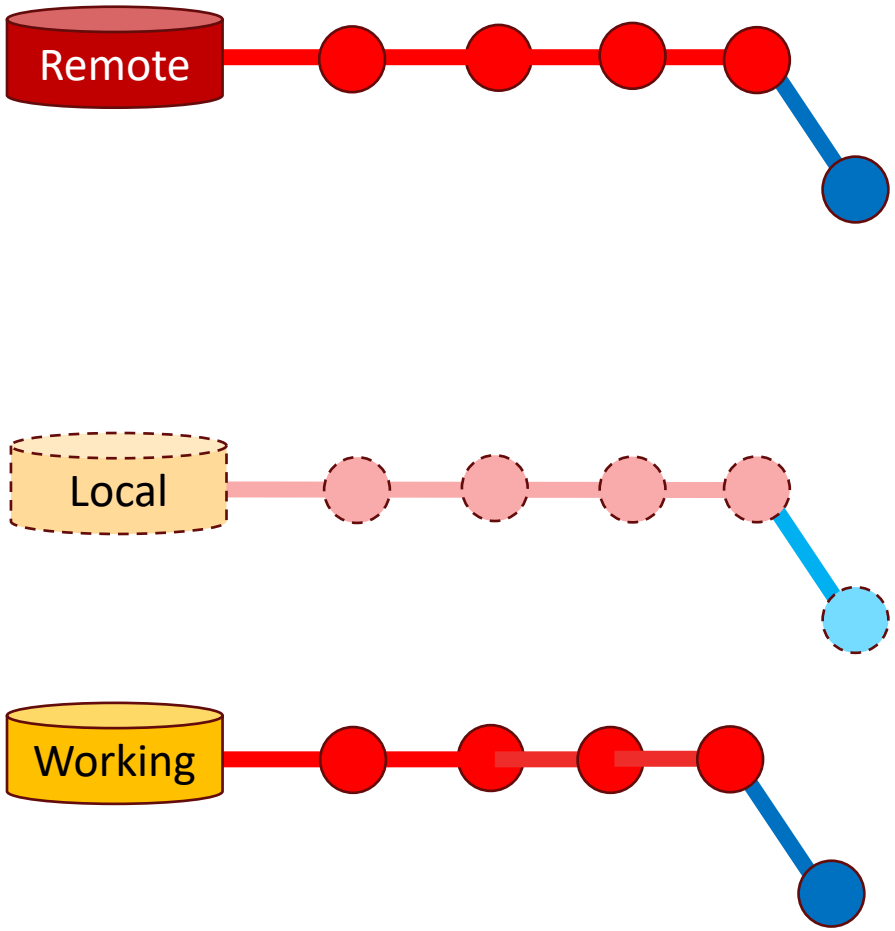
Workflow: Branches -3-



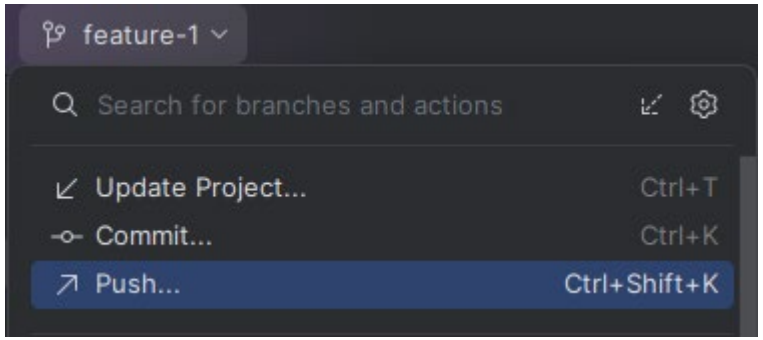


If Barry is happy with that change, he needs to “add” the changes and “commit” it.

Workflow: Branches -3-

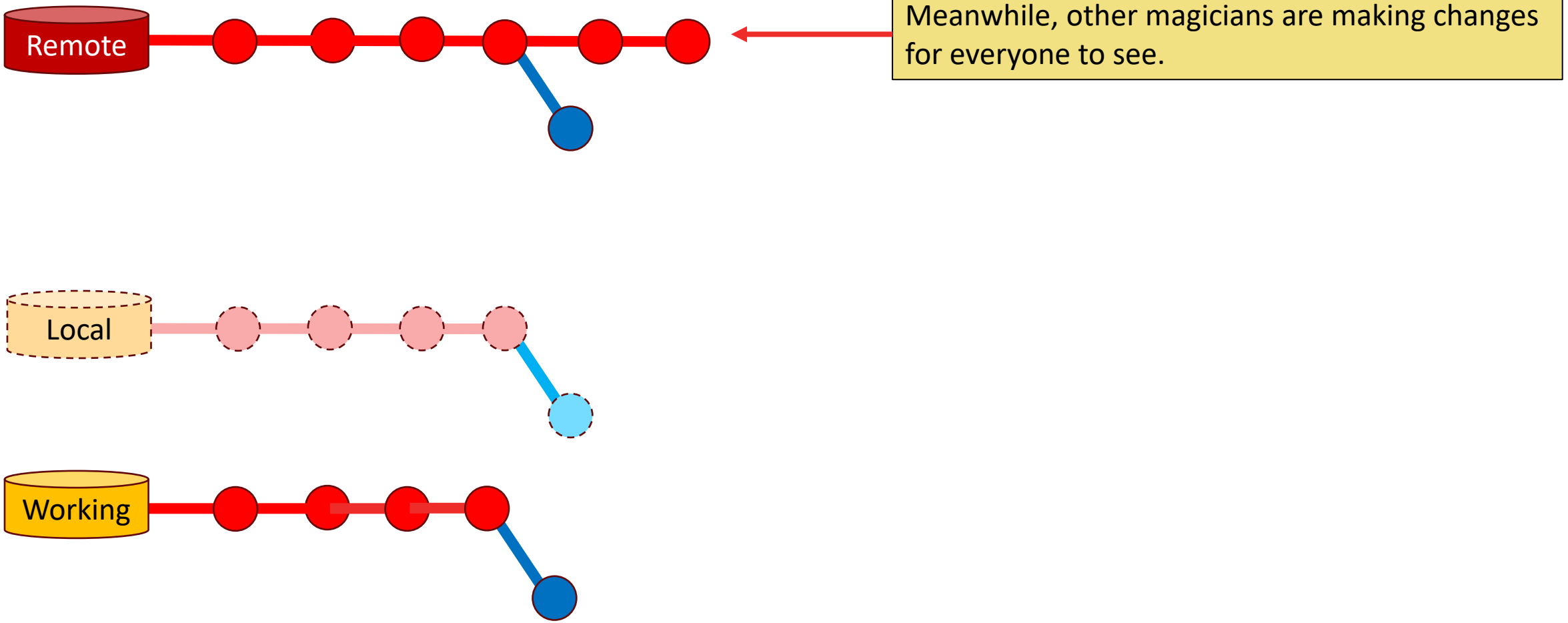


If he wants other magicians to access it, he must “push” those changes to the remote.

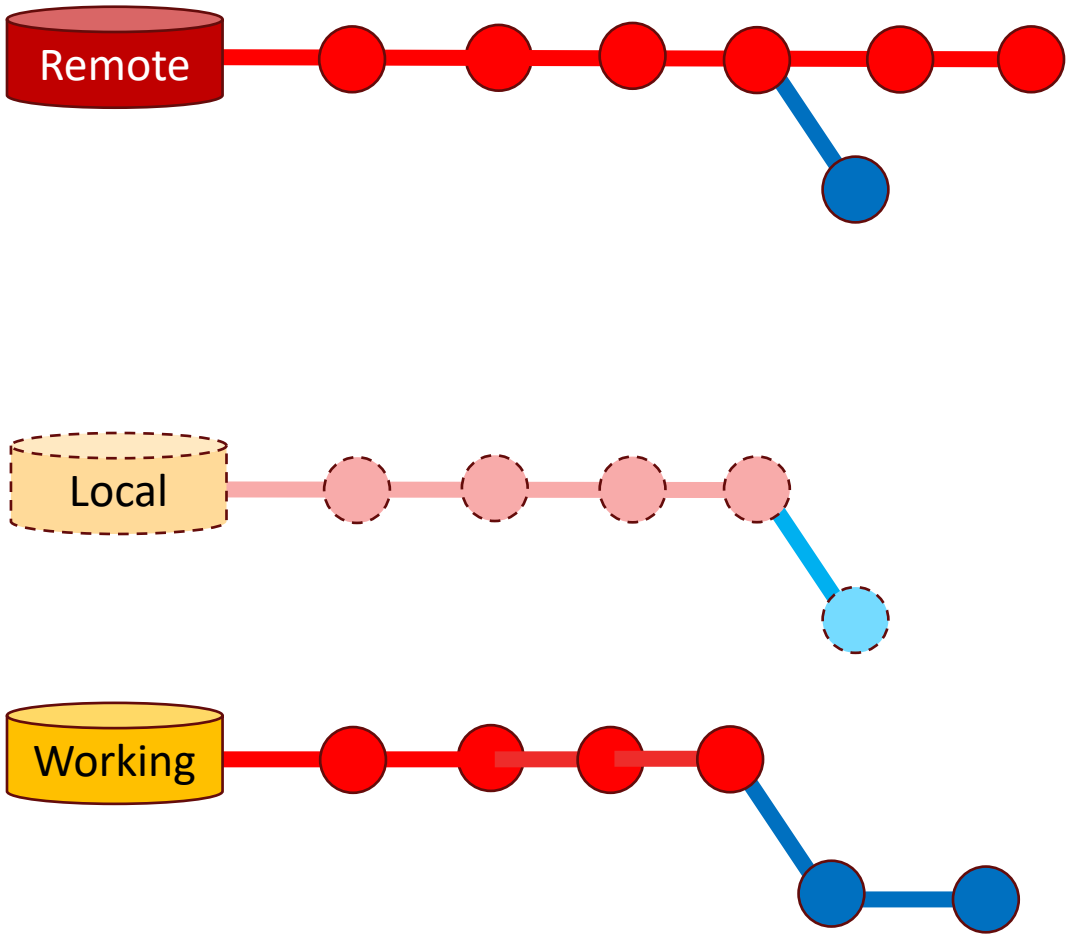


Experiment/Feature/Fix

Workflow: Merge -1-

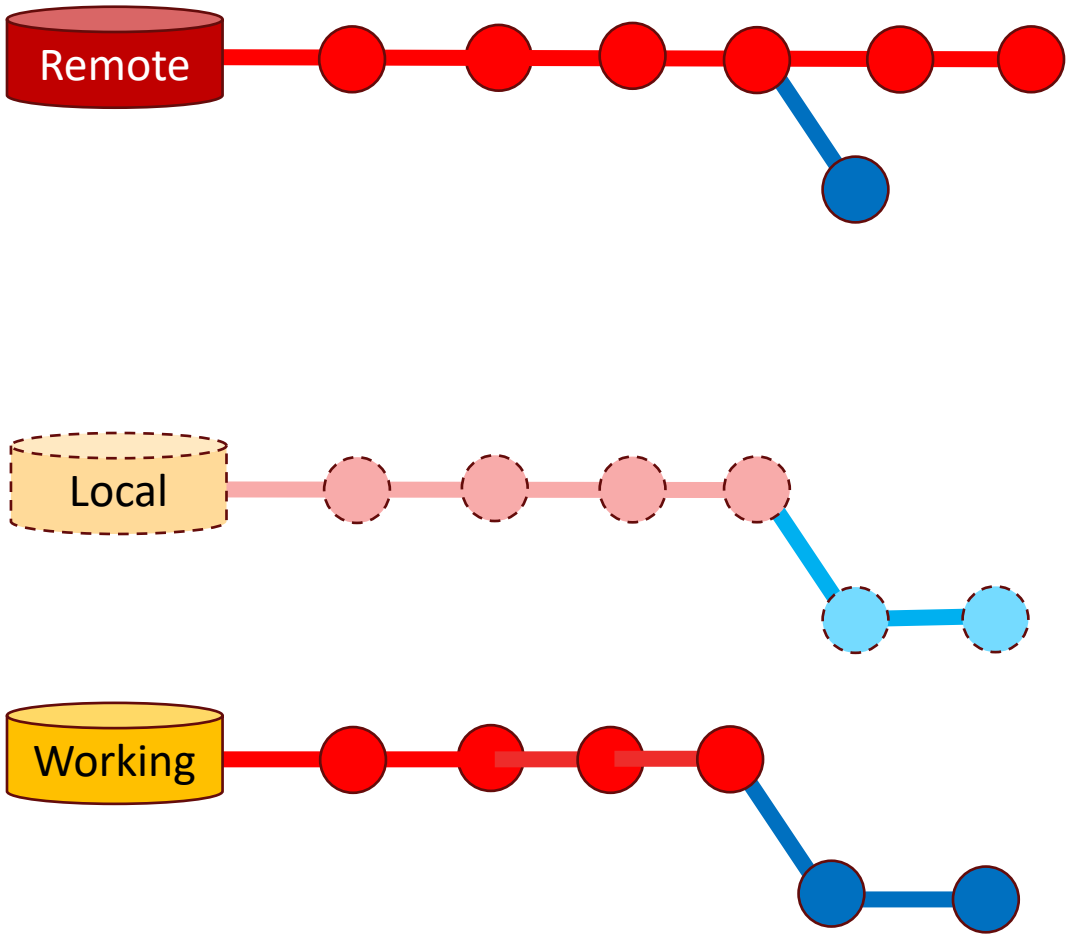


Workflow: Merge -1-



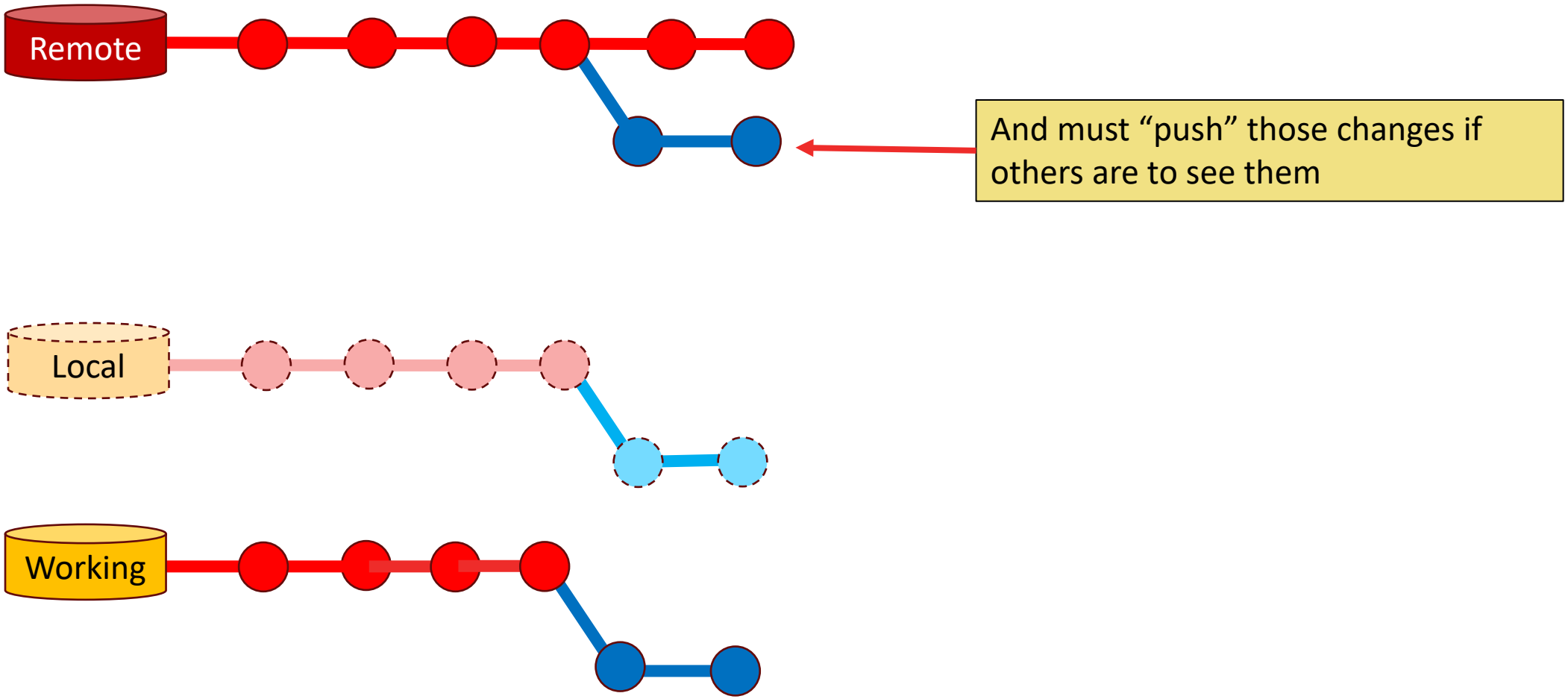
Barry can keep making his own changes.

Workflow: Merge -1-



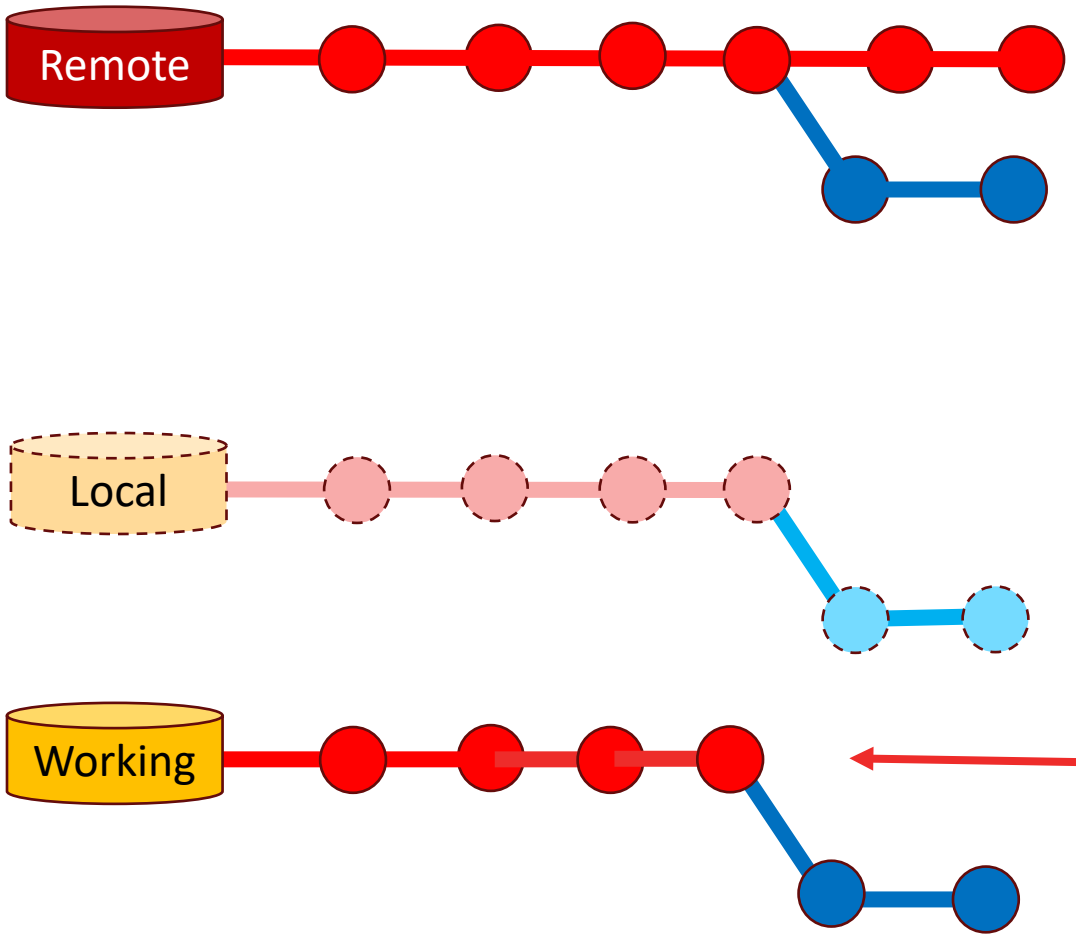
And committing those changes

Workflow: Merge -1-



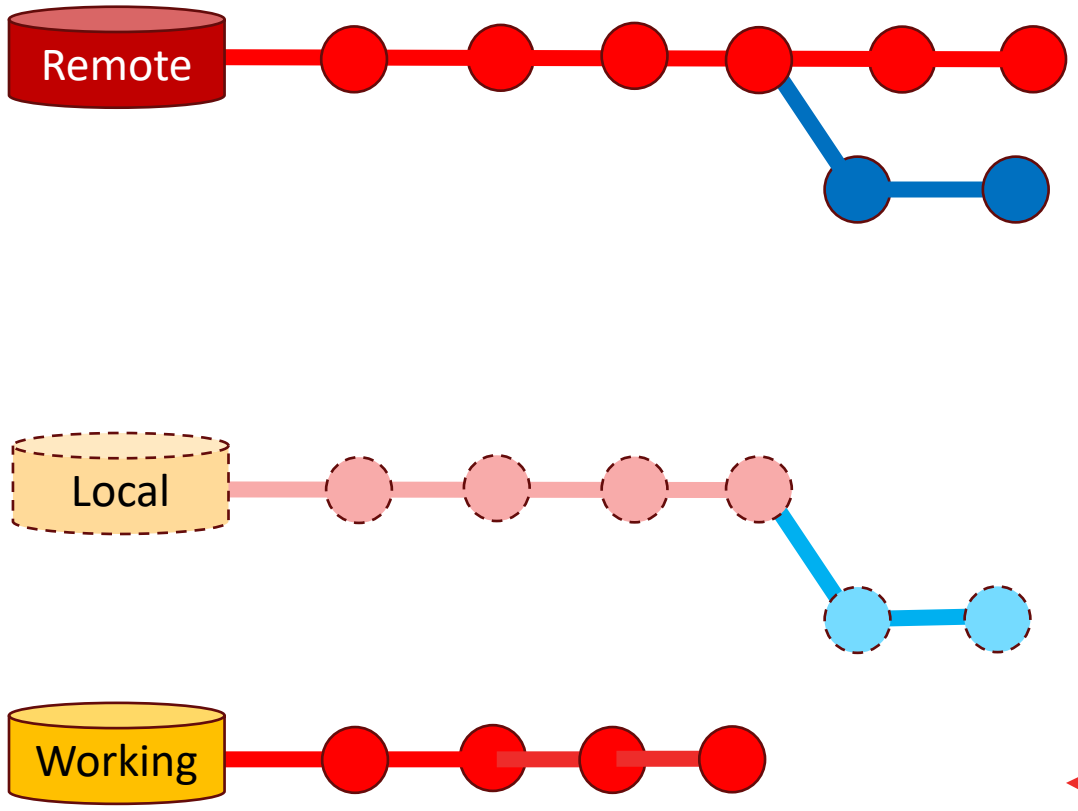
Merge

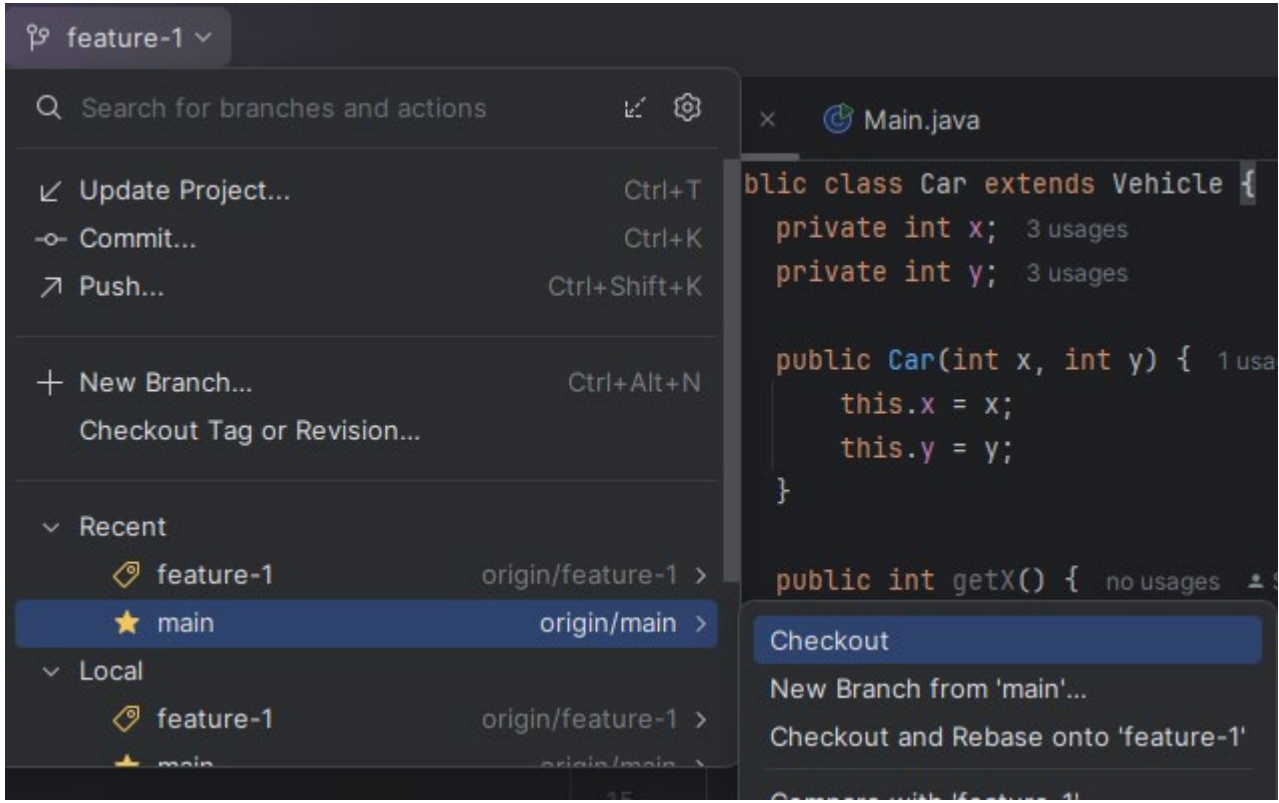
Workflow: Merge -1-



But notice, Barry's version of the main timeline is not up to date!

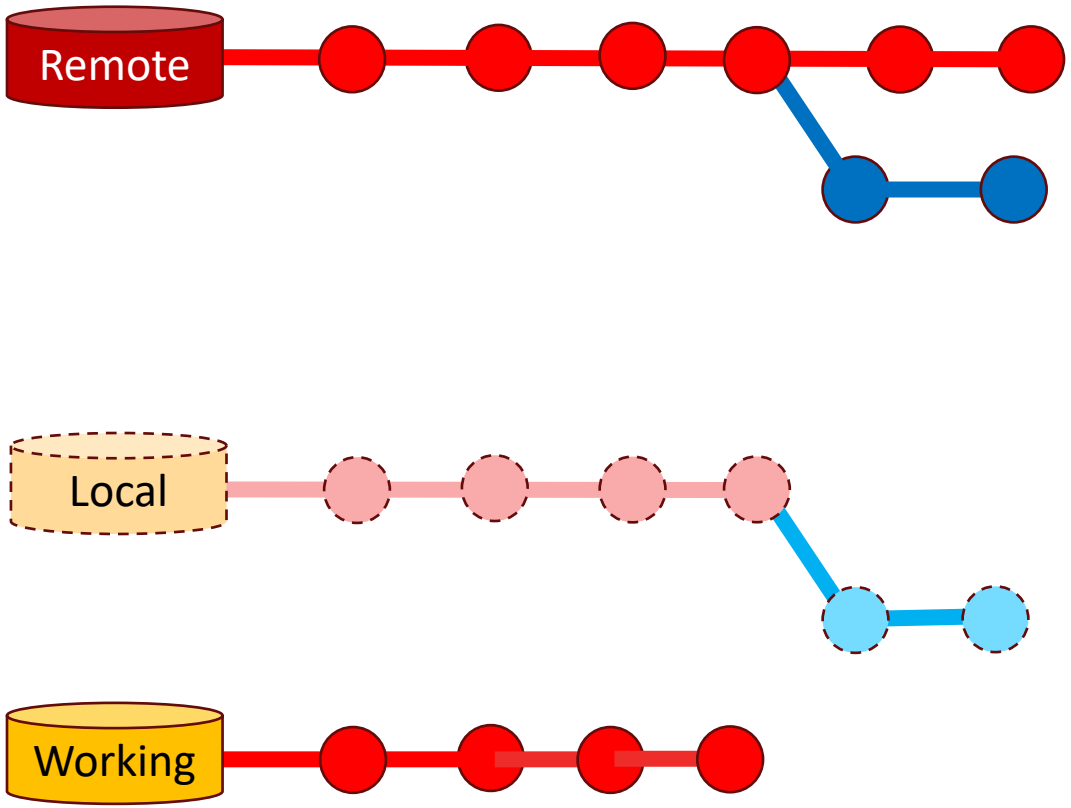
Workflow: Merge -1-





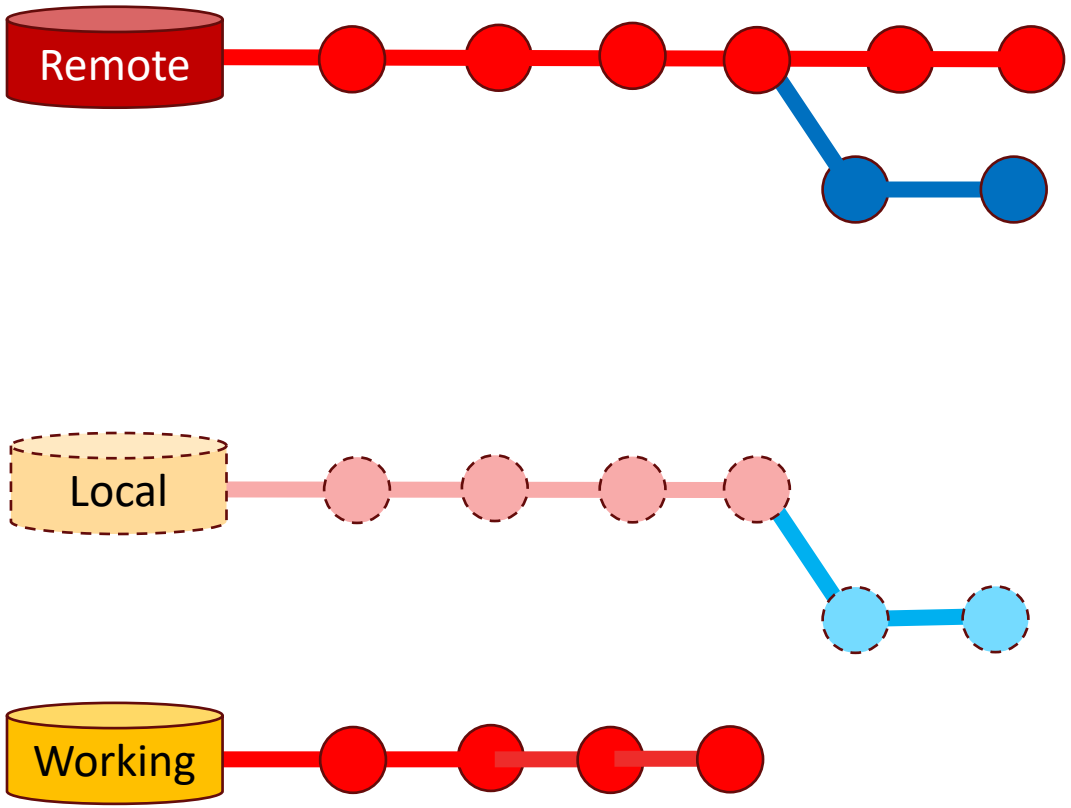
To update his version, he must "checkout" the main branch

Workflow: Merge -1-



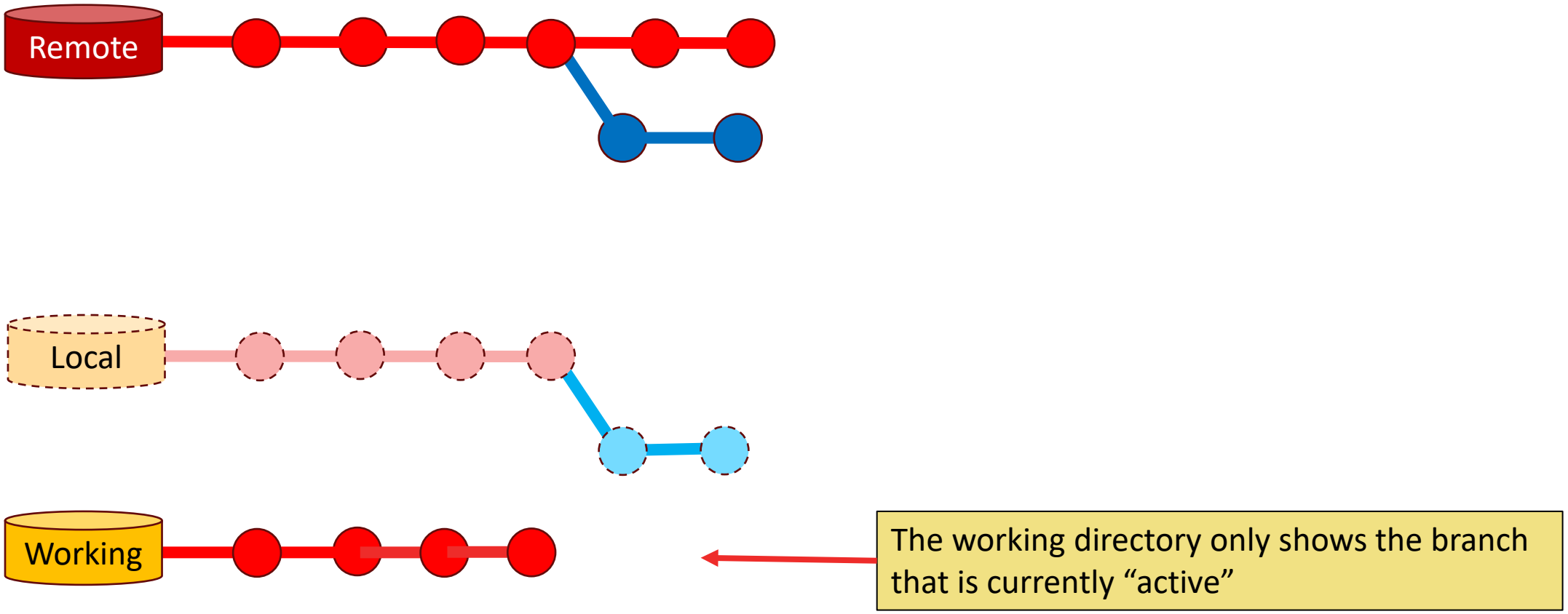
But where did all of his branch changes go?

Workflow: Merge -1-

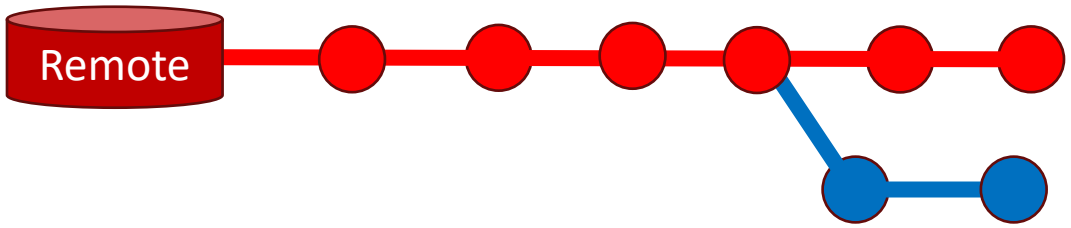


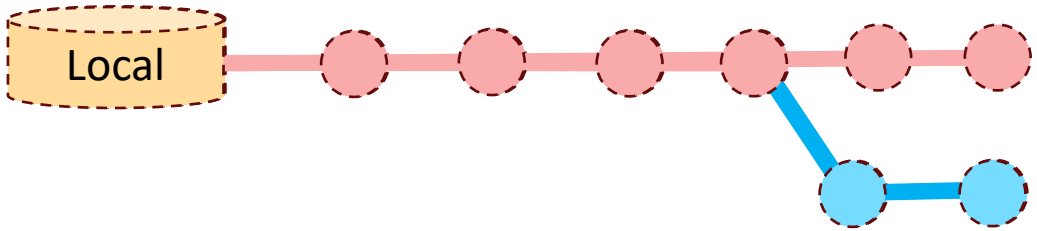
They are still preserved here, as long as he has been “committing” the changes

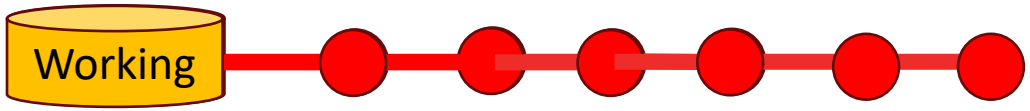
Workflow: Merge -1-

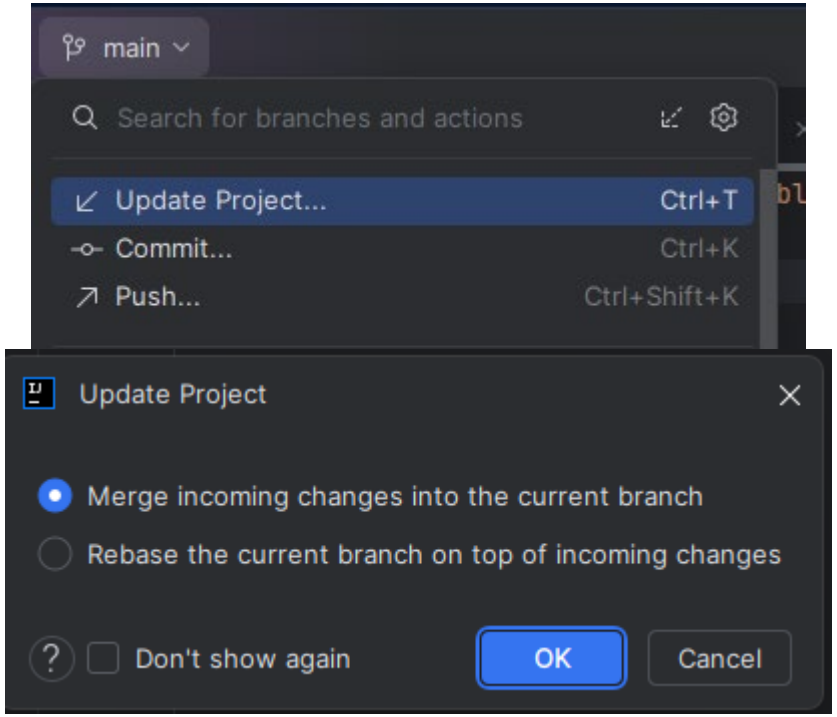


Workflow: Merge -2-





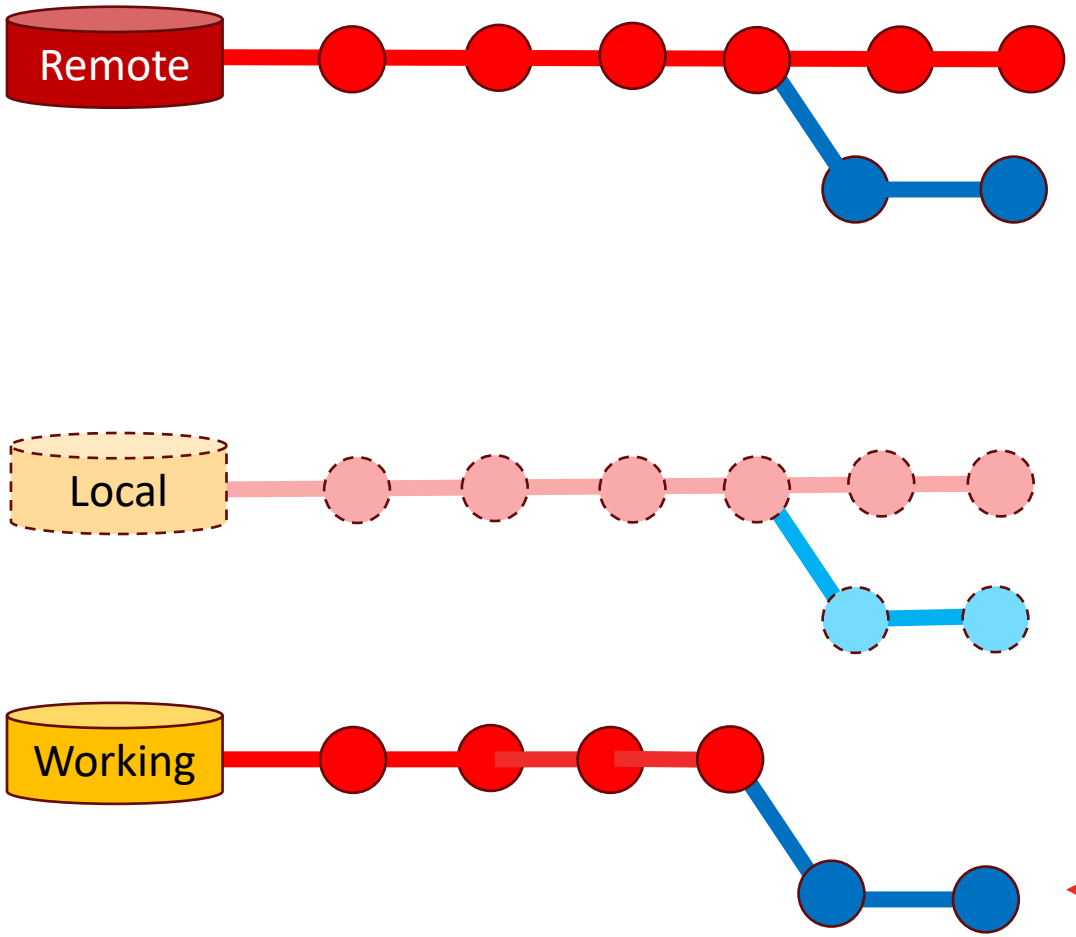


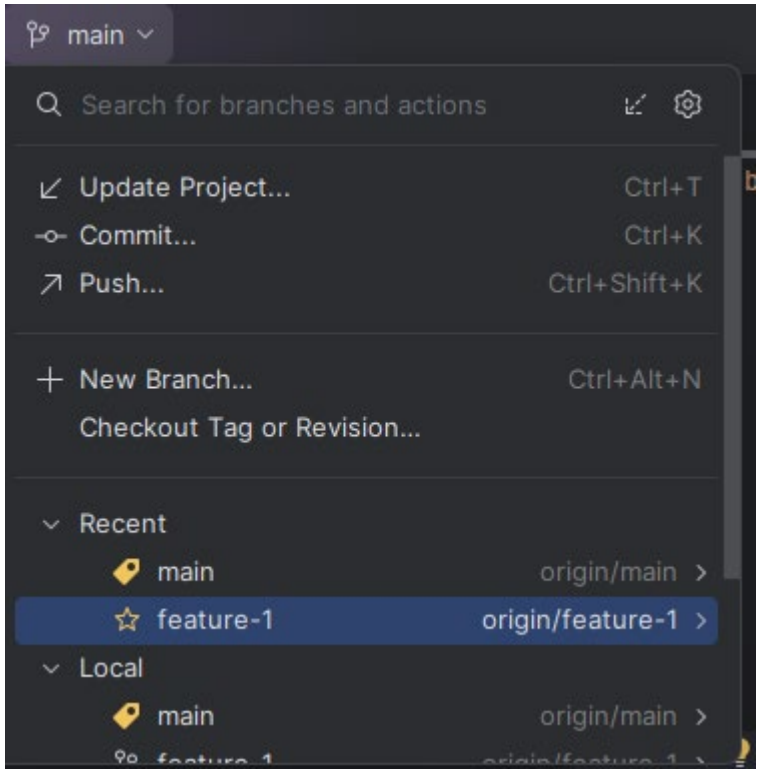


Which updates the “local” as well as the working directories

Using “pull” to update project (Project Update in Intellij)

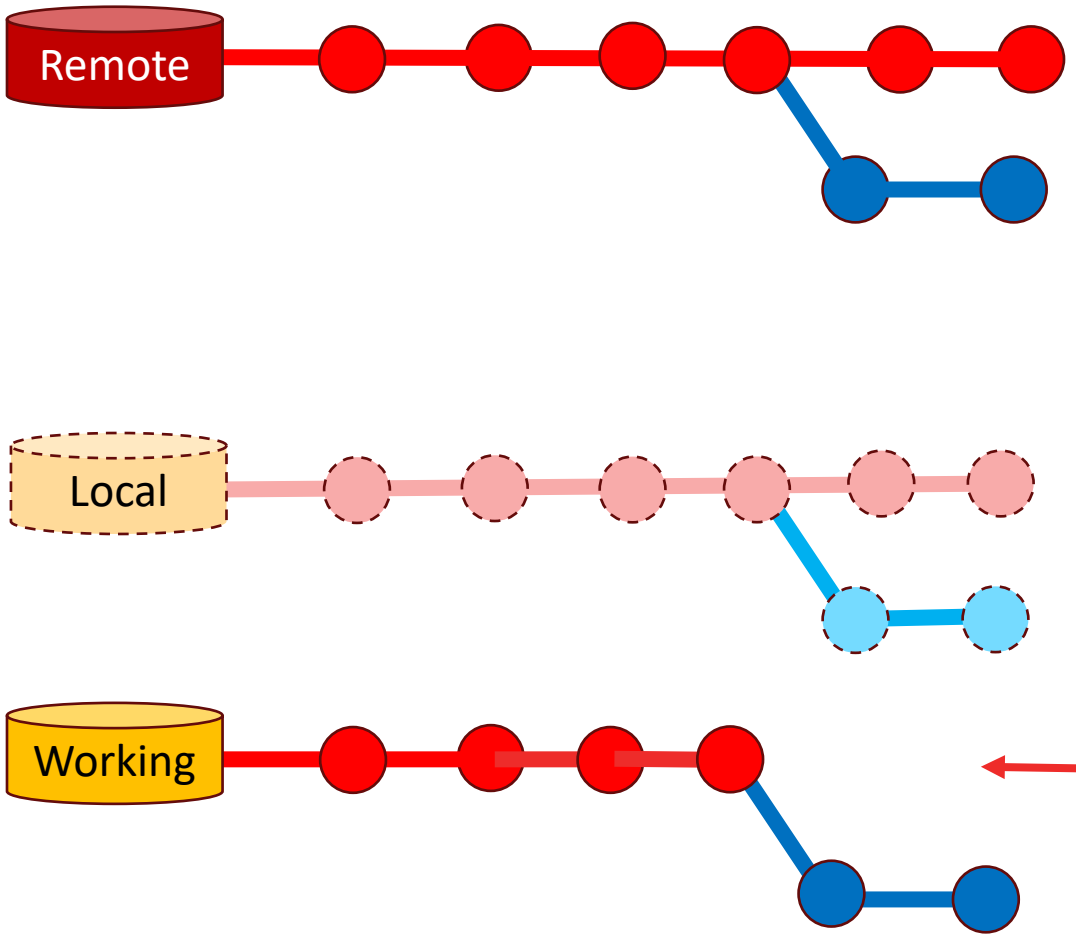
Workflow: Merge -2-





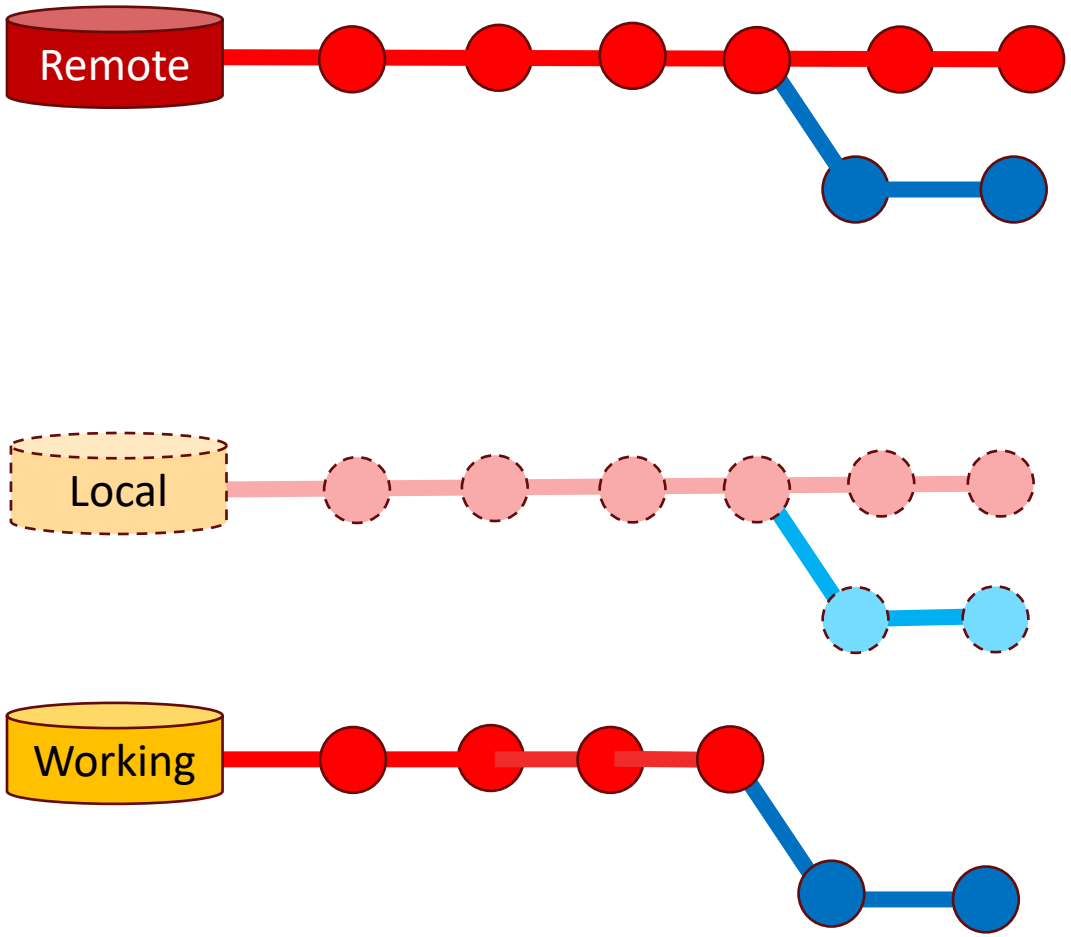
Barry then does a “checkout” to his own branch

Workflow: Merge -2-



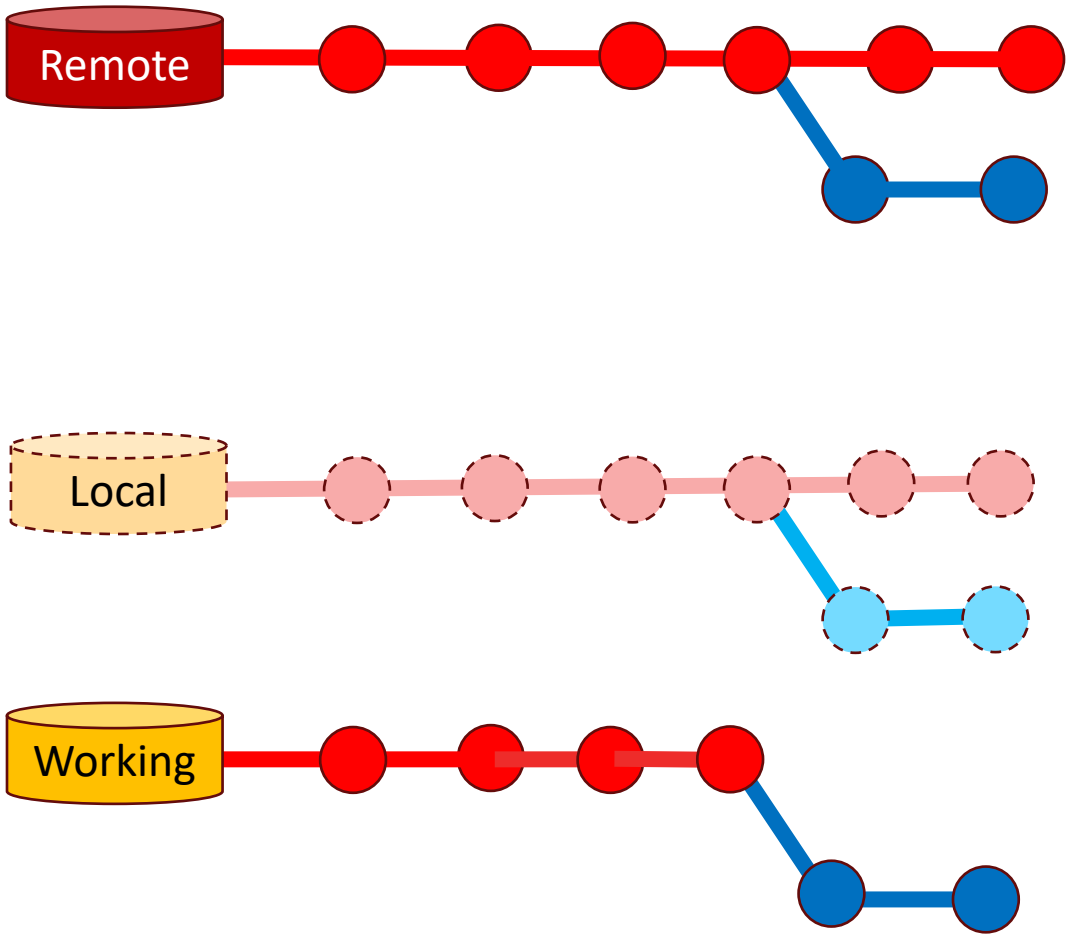
Where did the changes he pulled from remote go?

Workflow: Merge -2-



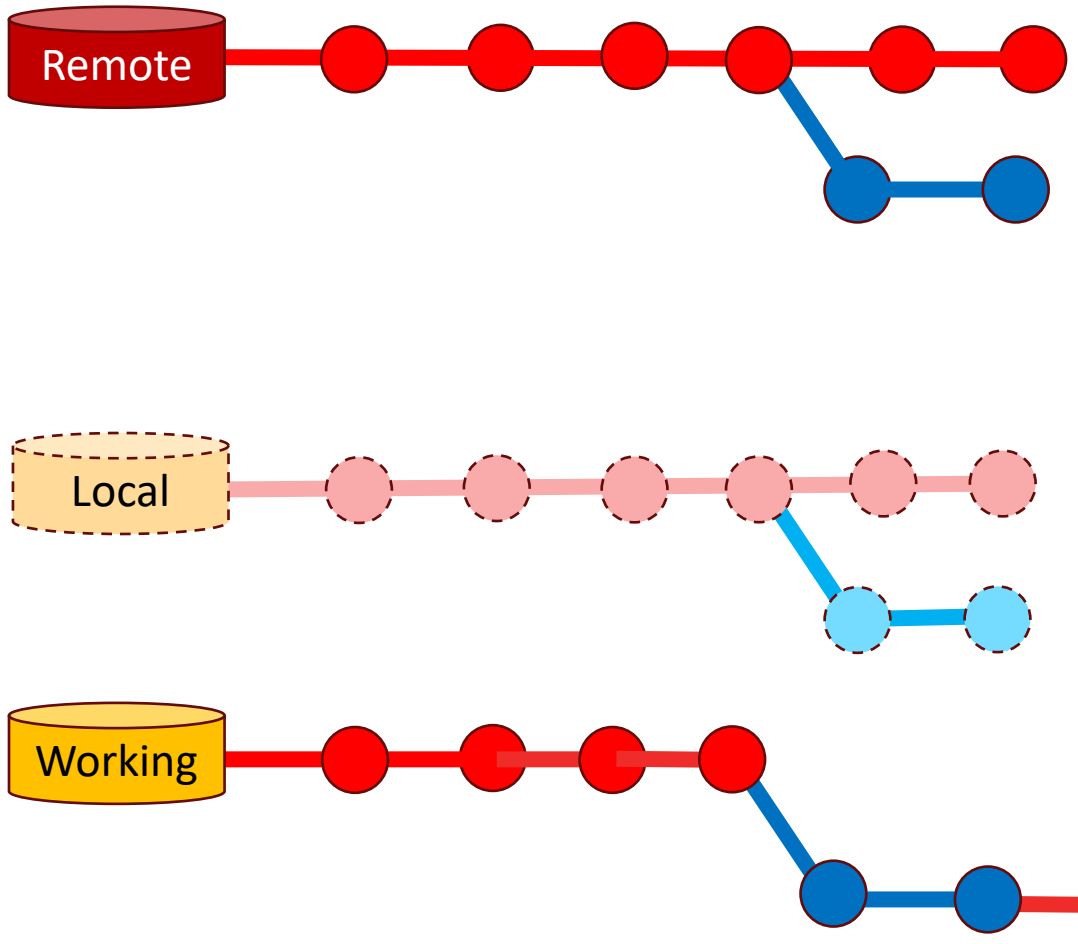
They are still here, working directory only shows the currently active branch.

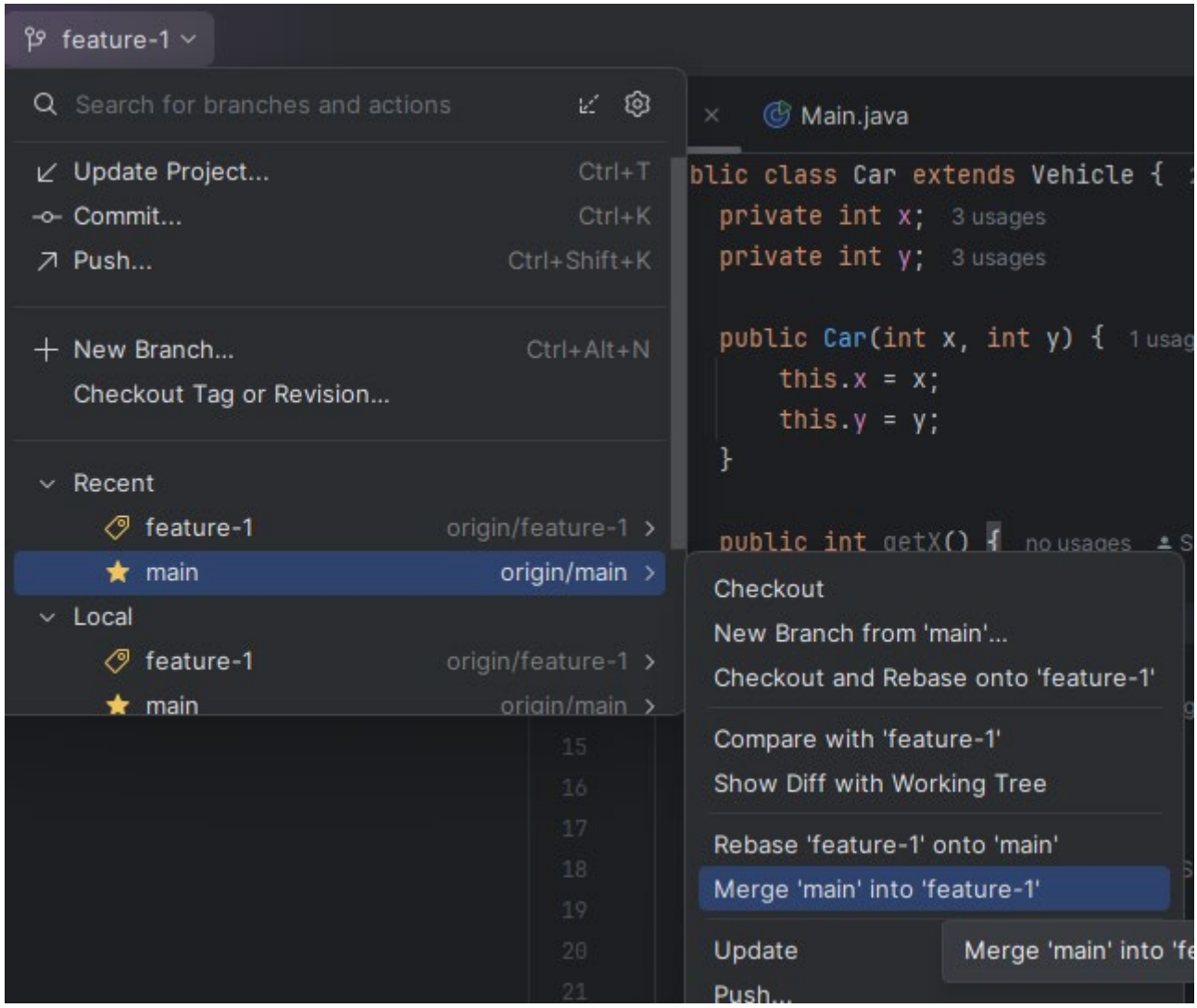
Workflow: Merge -3-



Now Barry can merge the changes from the main branch to his branch

Workflow: Merge -3-

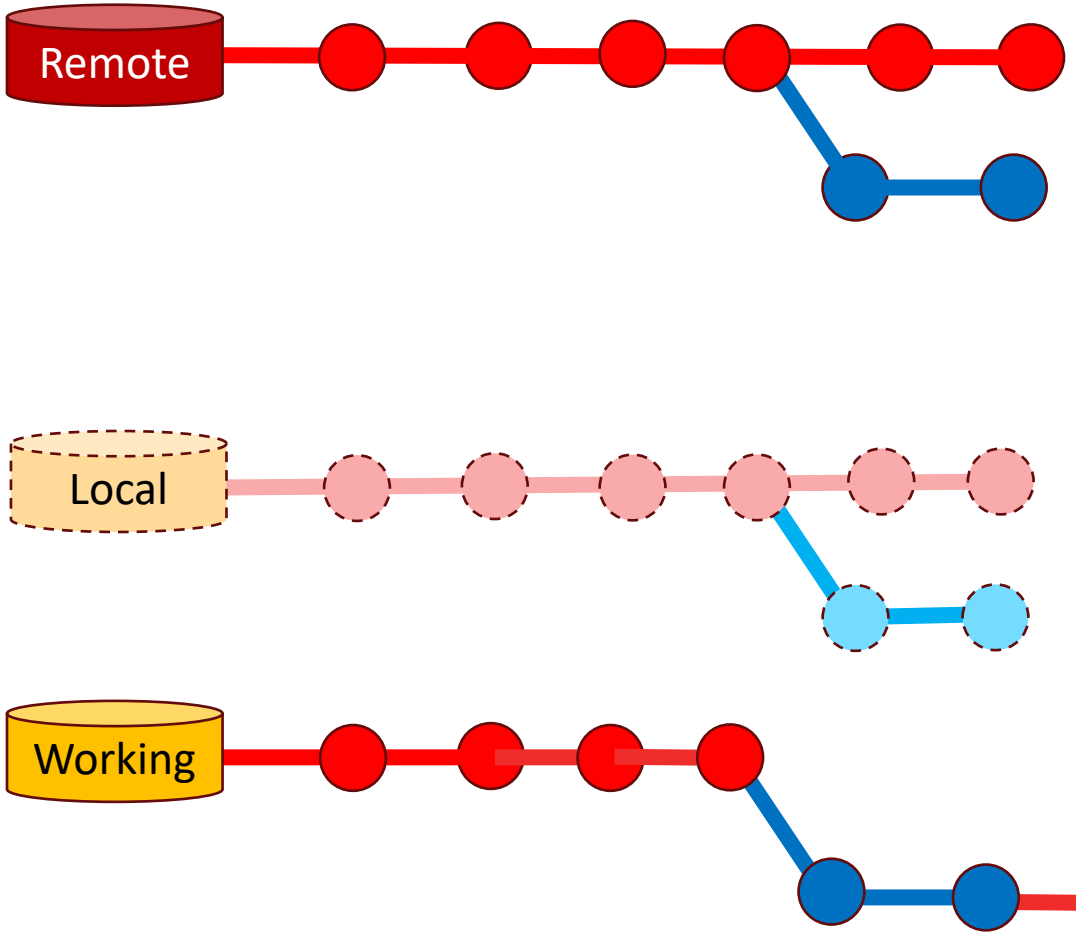


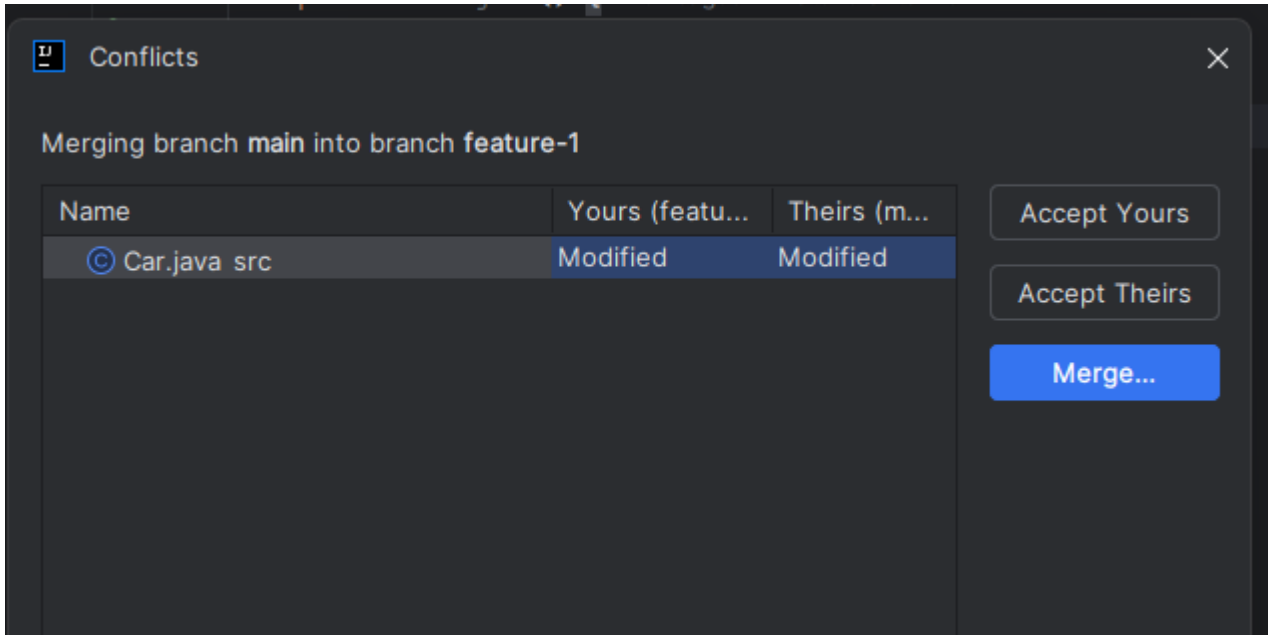


Now Barry can merge the changes from the main branch to his branch

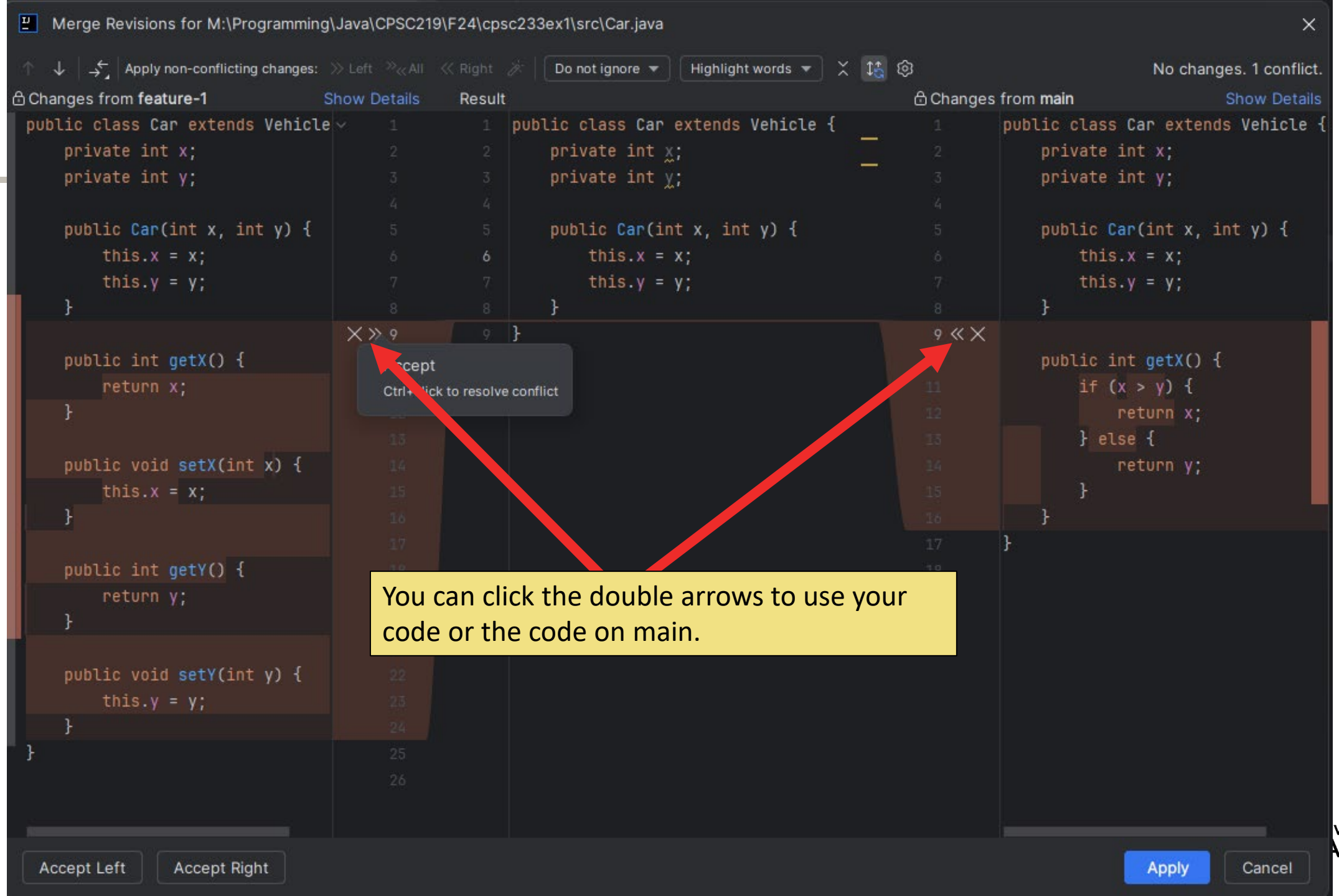
Merge Conflicts

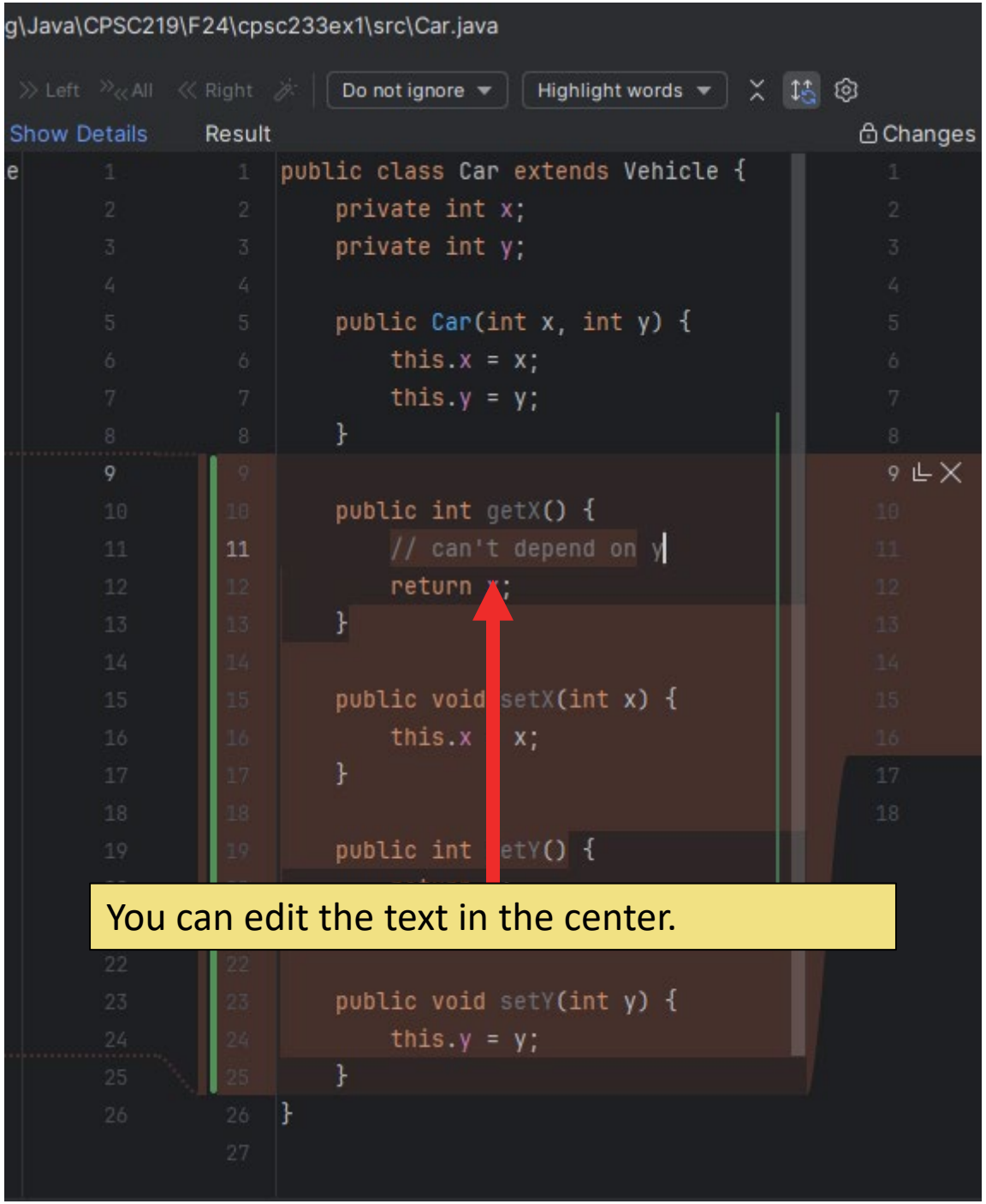
Workflow: Merge -3-



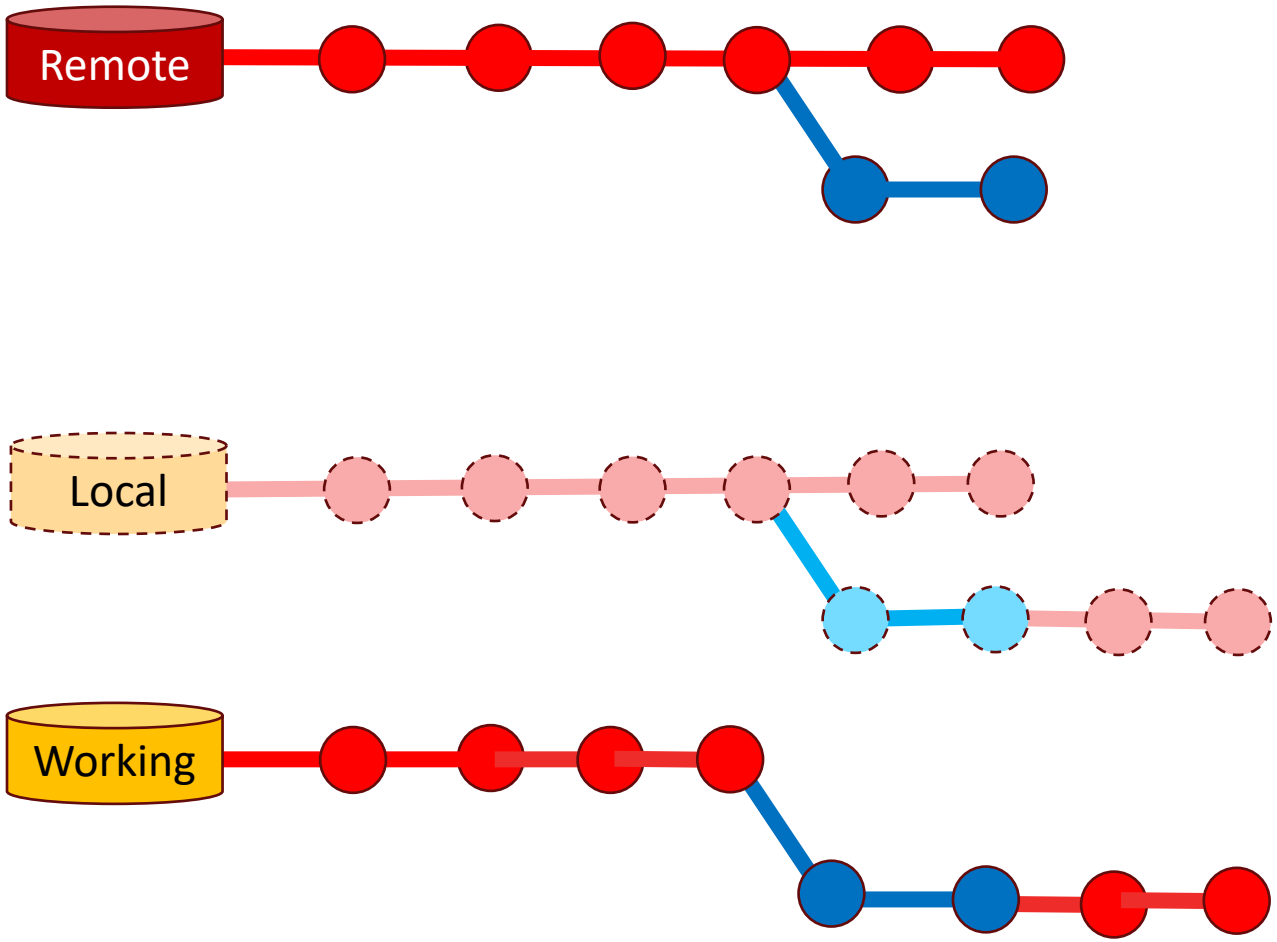


Resolve conflicts if there are any.


Merge Revisions for M:\Programming\Java\CPSC219\F24\cpsc233ex1\src\Car.java
Apply non-conflicting changes:
Left
All
Right
Do not ignore
Highlight words
No changes. 1 conflict.
Changes from feature-1
Show Details
Result
Changes from main
Show Details
public class Car extends Vehicle {
private int x;
private int y;
public Car(int x, int y) {
this.x = x;
this.y = y;
}
public int getX() {
return x;
}
public void setX(int x) {
this.x = x;
}
public int getY() {
return y;
}
public void setY(int y) {
this.y = y;
}
}
Ctrl+ lick to resolve conflict
public int getX() {
if (x > y) {
return x;
} else {
return y;
}
}
You can click the double arrows to use your code or the code on main.
Accept Left
Accept Right
Apply
Cancel

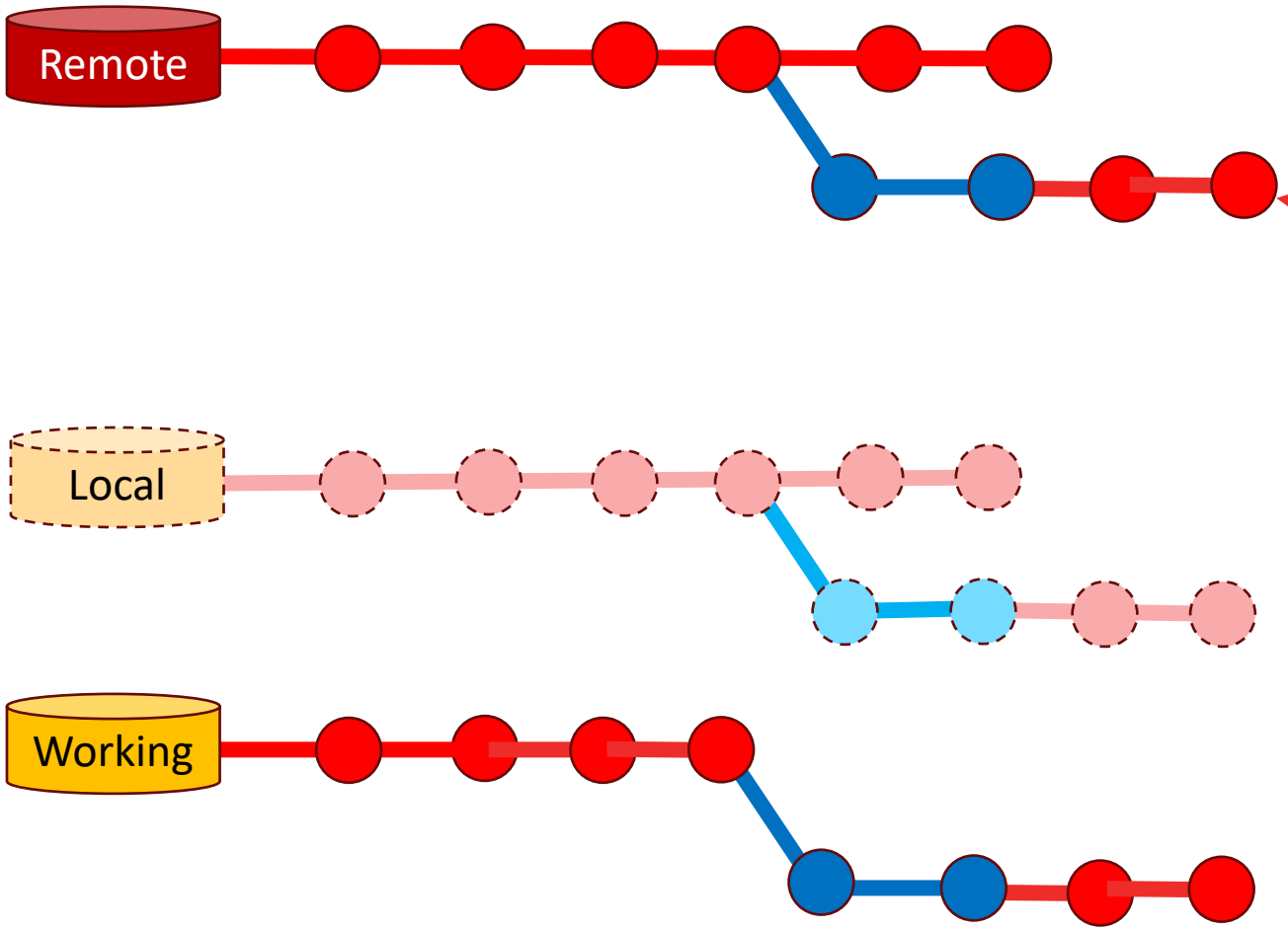


Workflow: Merge -3-

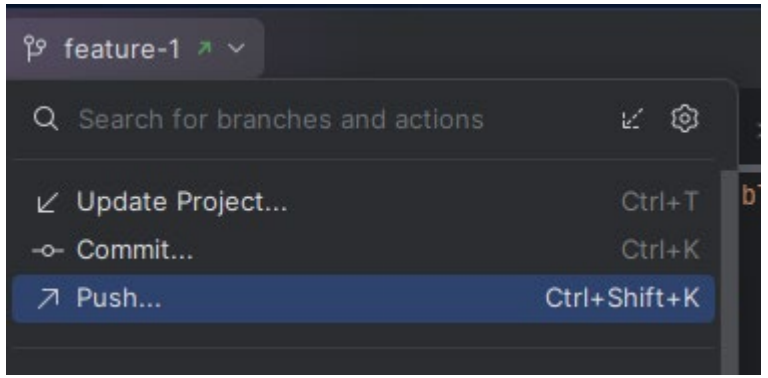


Commit changes (intellij does this automatically for you)

Workflow: Merge -3-

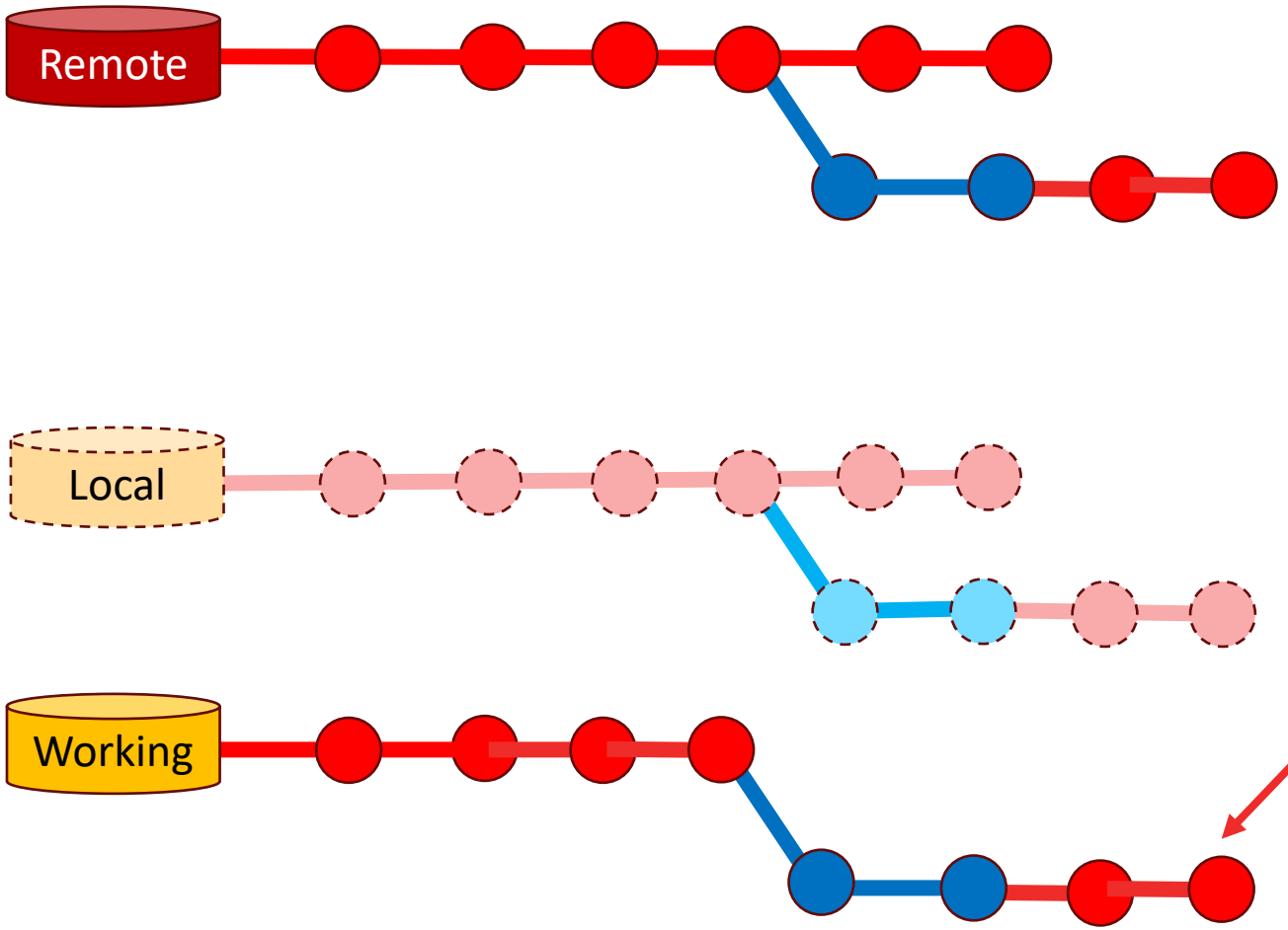


And push those changes to the world



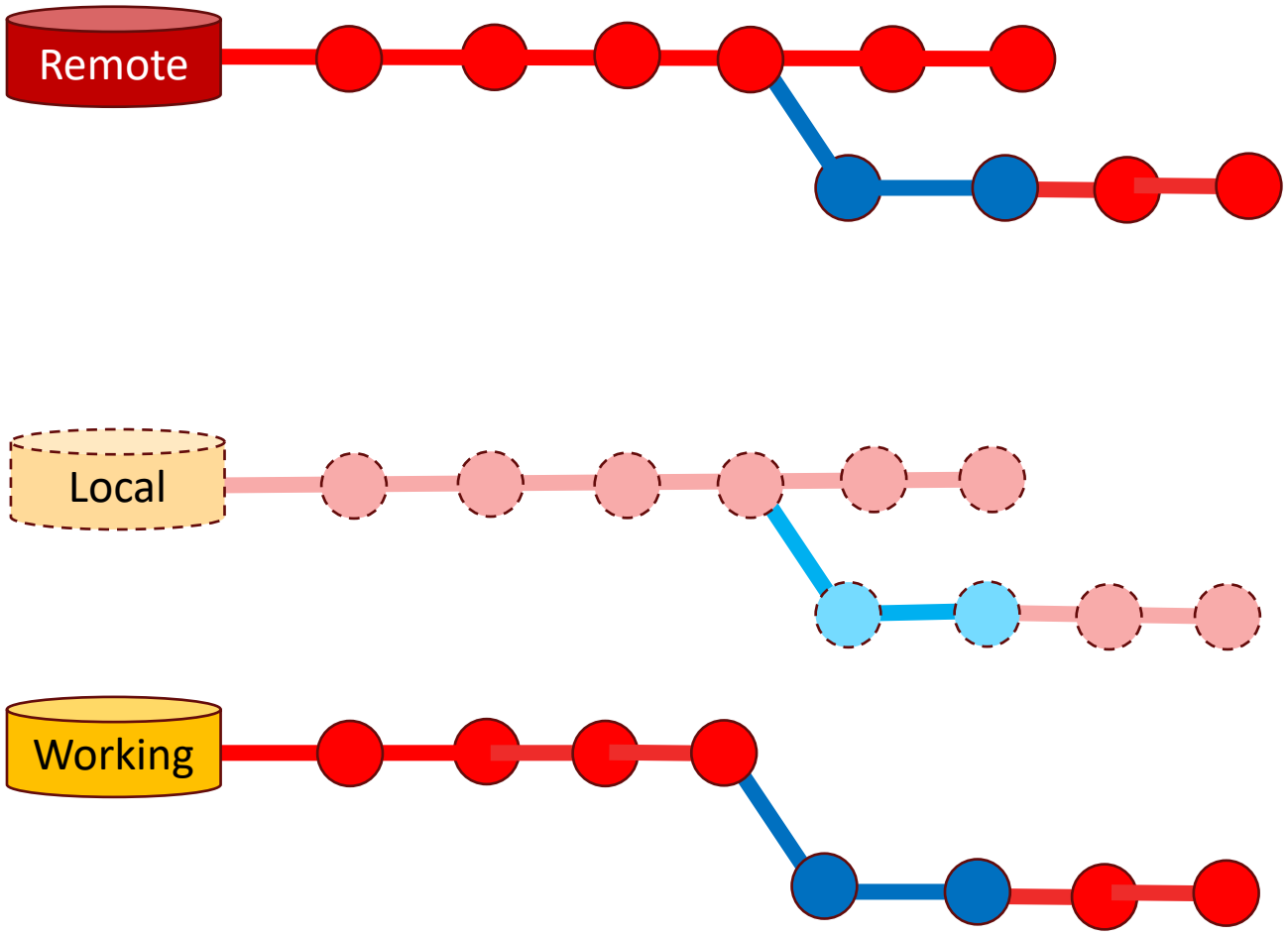
Pull requests

Workflow: Merge -4-

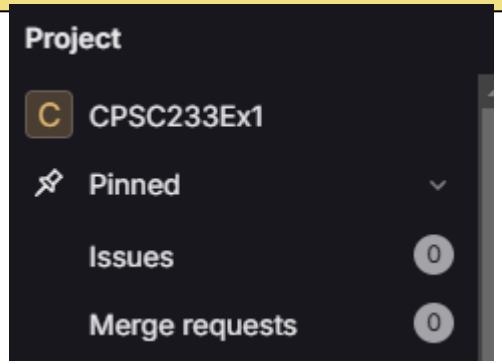


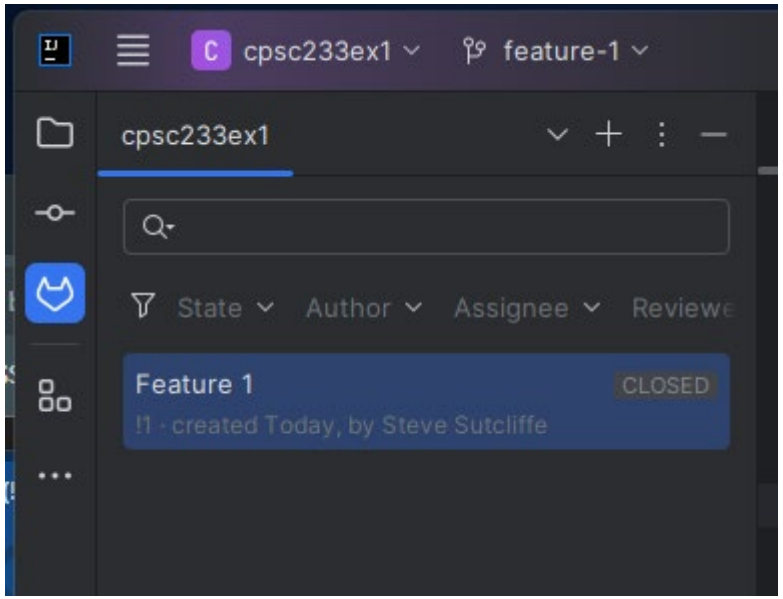
Once Barry is happy with the result, and wants to make his changes permanent

Workflow: Merge -4-



Barry will make a Pull Request (PR), called a Merge Request in Intellij, using the GitLab "Merge Requests" tab, or doing a Merge Request in IntelliJ





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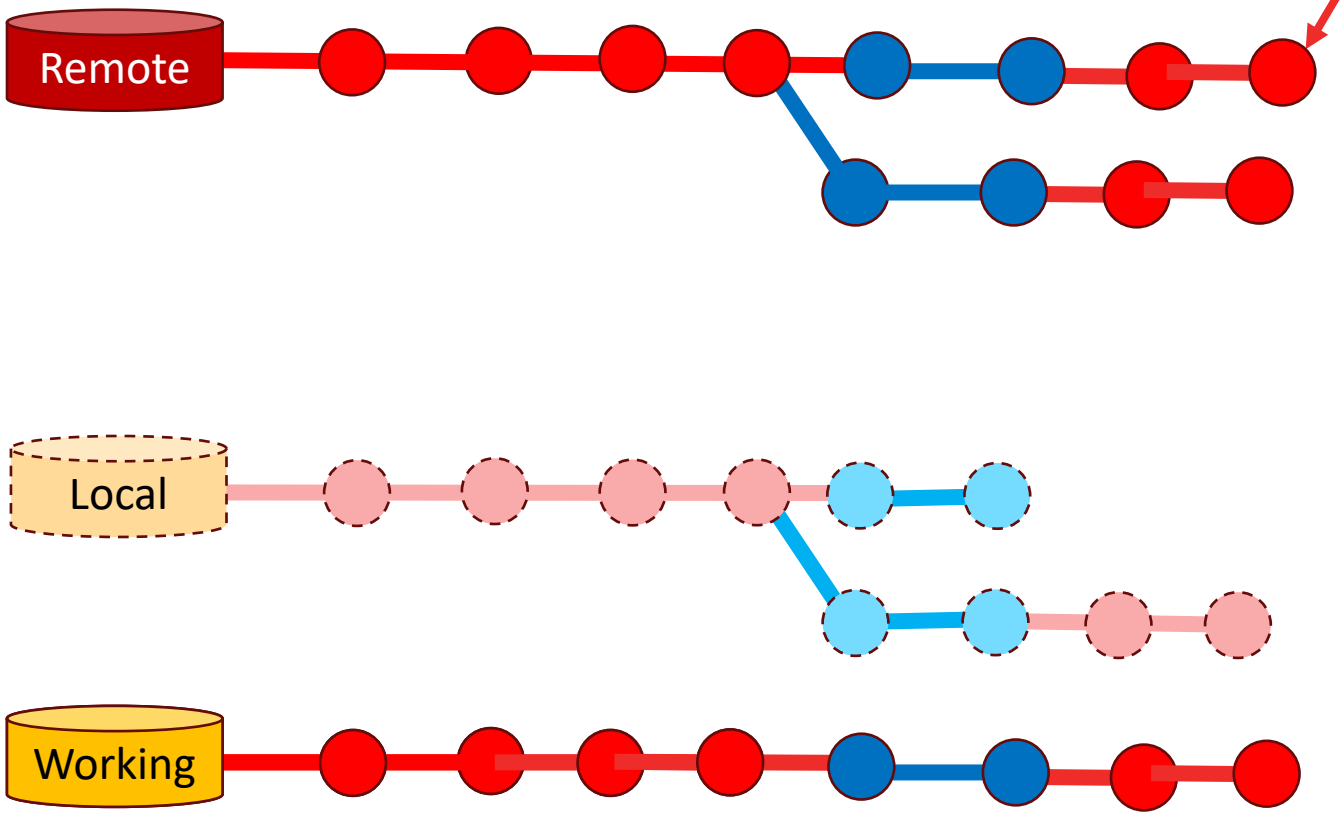
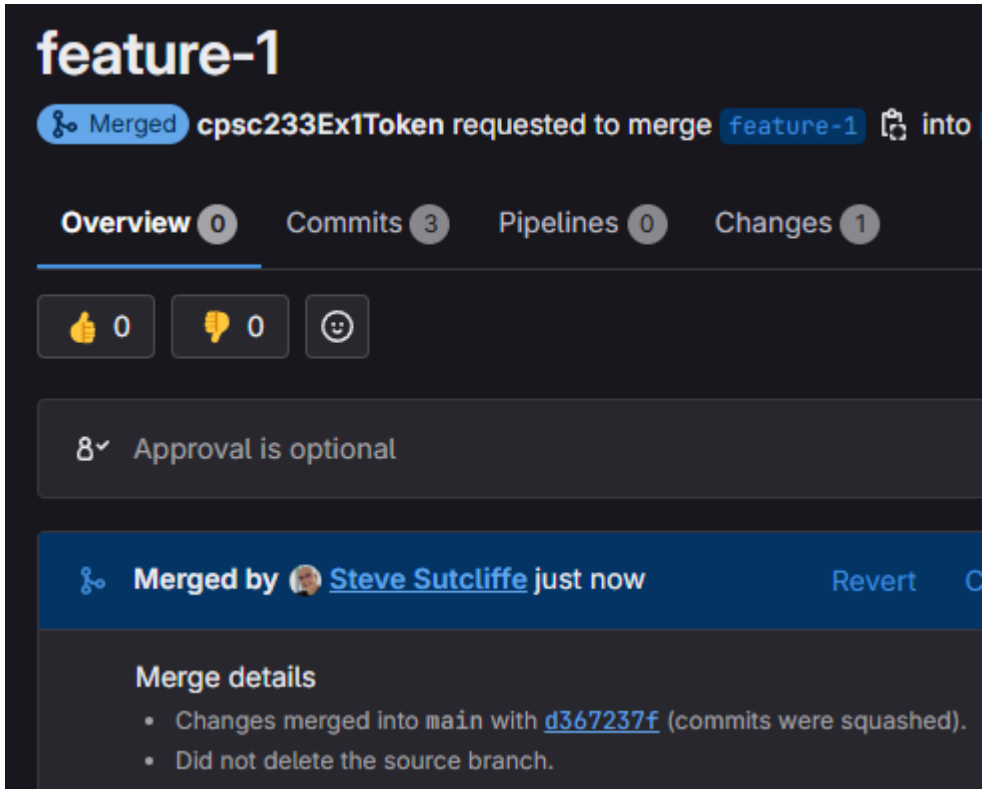
Workflow: Merge -4-

Then one member of Barry's team will Approve the PR to make the change permanent in remote





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Onward to … System.

Jonathan Hudson
jwhudson@ucalgary.ca
https://pages.cpsc.ucalgary.ca/~jwhudson/

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