

Source Control

Comp-361 : Source Control
Lecture 6

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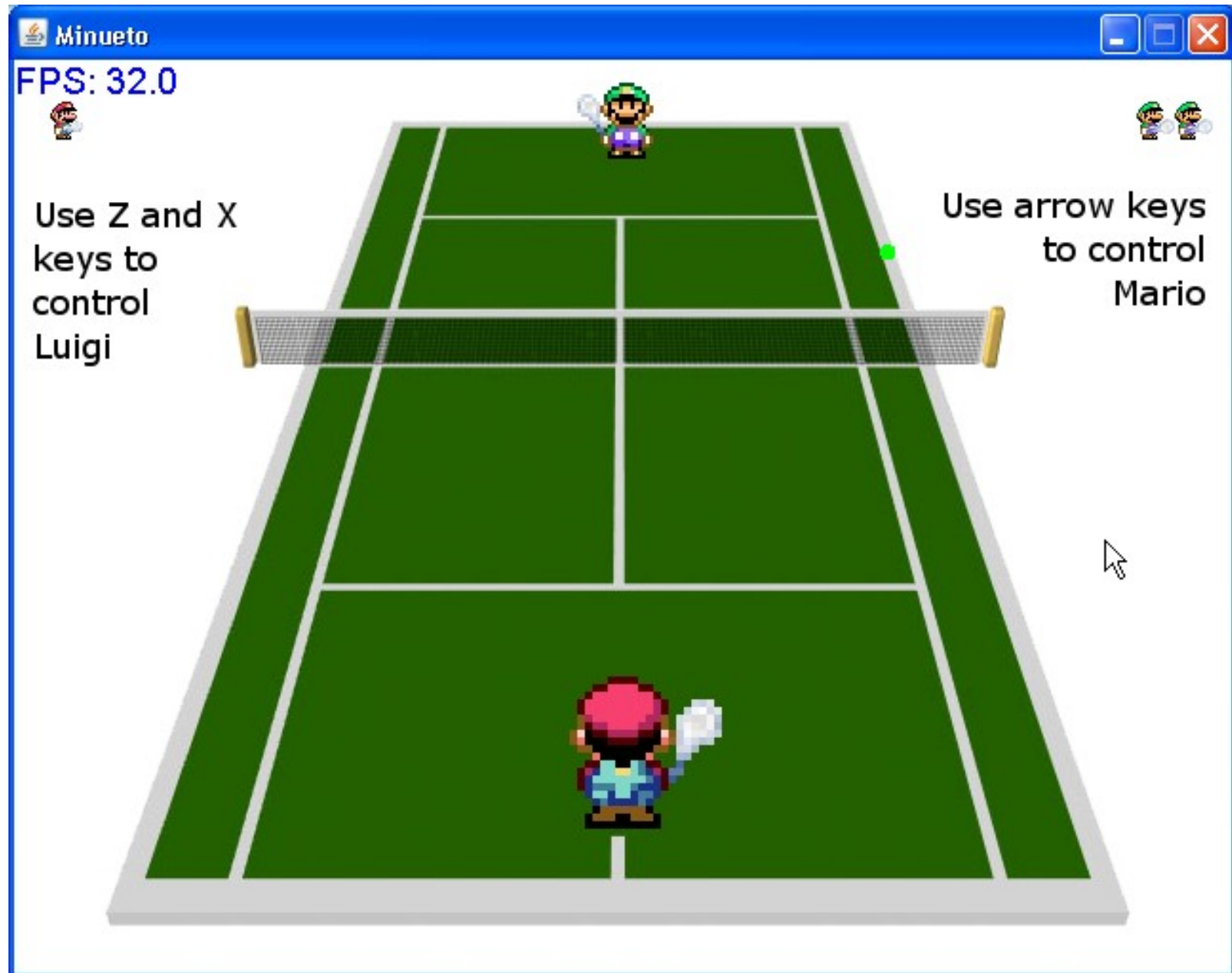
Chicken Pox

- A student in the class was diagnose with Chicken Pox.
 - ◆ If you didn't get it as a child, or not vaccinated, time to get vaccinated.
 - ◆ If you suffer from a form of immune-deficiency, time to see a doctor.
- Your official McGill email box contains more information.

Pong 36-Hour Challenge

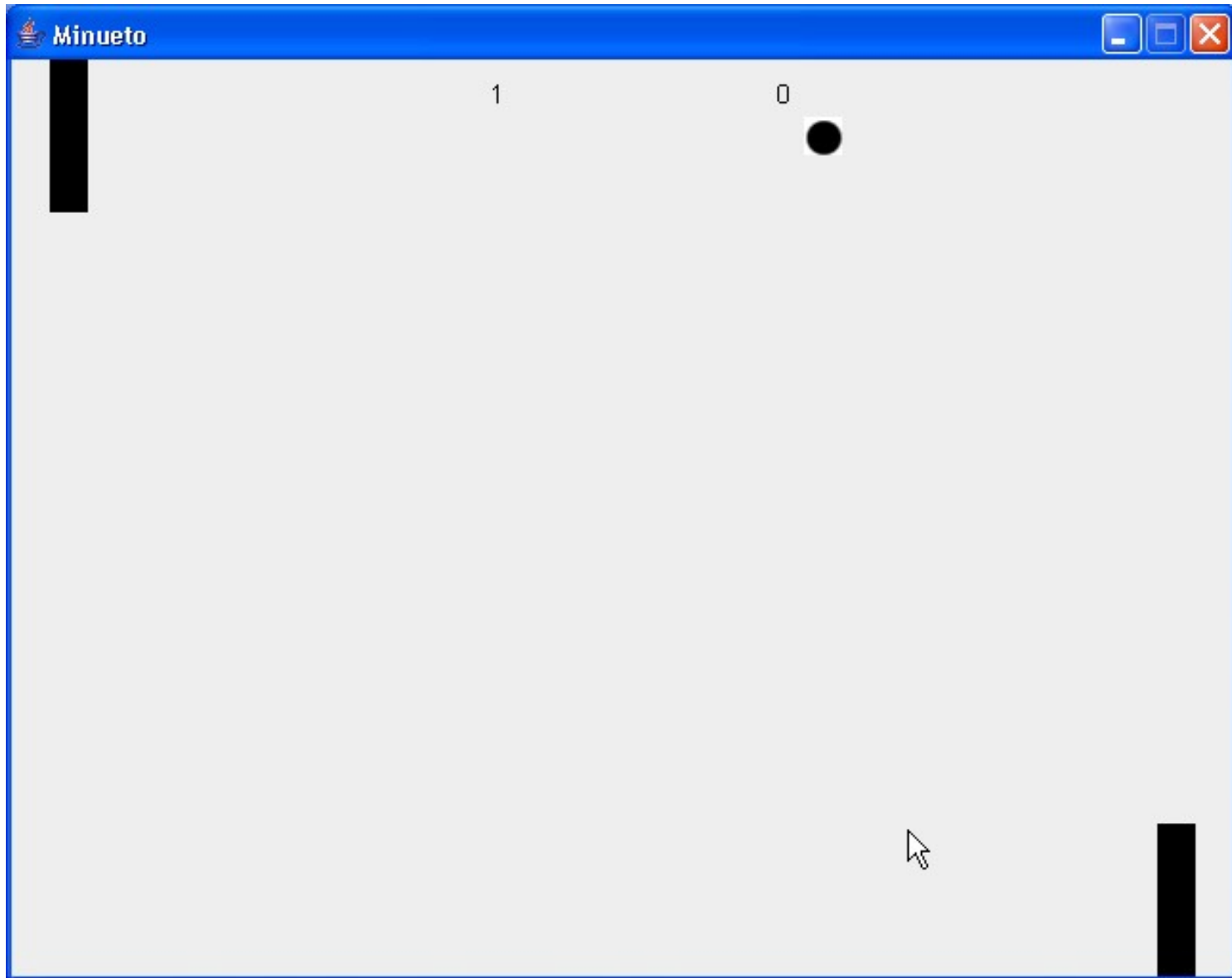
- Gabriel Lemonde-Labrecque
- Luke Bayly
- Marc-Olivier Dozois Lyrette
- Mitch Shum-lok
- Robert Rolnick
- Winston Lin

Winner : Mario Pong



Gabriel Lemonde-Labrecque

Participation : VotE



Luke Bayly

Question

Who knows about source control systems?

Question

Who has use a source control system in a previous project?

Question

Who has done a project where they find that the source control system was useful?

Source Control

It's not enough to set it up, you need to use it!

– Emmanuel

Question

Have you ever been working on a source file and wished you could retrieve a previous version of a file?

Question

Have you ever worked on a team project and had difficult sharing files with your partner?

- Source Control is about the management of revision
 - ◆ changes are noted with a revision number

Why?

- For sharing purposes (team work)
- For tracking / auditing purposes (accountability)
- For debugging purposes (history)

- The code is located in one central location
 - ◆ Code repository
 - ◆ Always contains the latest official version
- Each developer acquires his copy of the code
 - ◆ Local development
- To share changes, he must commit them to the repository.
 - ◆ Each change is assigned a revision number

Can't avoid it

- If you work in industry, you will use a source control system.

Team Overlap

- Source control allows large groups of developers to work on the same project
 - ◆ Minimizes the risks of overlapping changes.
- Each developer can work on his local copy
 - ◆ Doesn't affecting other developers.
 - ◆ Only commits once changes are stable.

Question

What happens if several developers want to work on a separate experimental version of an application?


Question

How can I record important revisions?

Trunk / Branch / Tags

A source tree is separated into three categories: the trunk, branches and tags (tree analogy).

- The trunk is the main copy of your code.
- Branches are separate copies of your main code.
- Tags are snapshots of the trunk or branches.

- CVS is the Concurrent Versions System, was created in the mid 1980's.
 - It was recreated as a follow up to an earlier version system called Revision Control System (RCS).
 - ◆ RCS was great for individual files, bad for large projects.
- 

- Subversion (a.k.a. SVN) was developed as a modern day replacement to CVS.
- Subversion has many key features:
 - ◆ Commits are truly atomic (can't have problem with 2 people committing at the same time).
 - ◆ You can now move or rename files.
 - ◆ Strong integration with Apache.
 - ◆ Etc ...

To set up a SVN at School

- You will need to collect the CS user names of each team members.
- Send a request to help@cs.mcgill.ca for SVN directory for your Comp-361 project along with the collected user names.

Creating a repository

- To create a repository, you simply need to use the svnadmin command.

```
svnadmin create /xtra/2008/cs361/team1
```

- ◆ This creates an svn directory in /xtra/2008/cs361/team1
- The next step would be to set up a trunk/branch/tag structure.
 - ◆ But you don't need it.

URL of repository

- To use a repository, you need its location (URL)
- The URL depends on which access method you use.

`file:///directory`

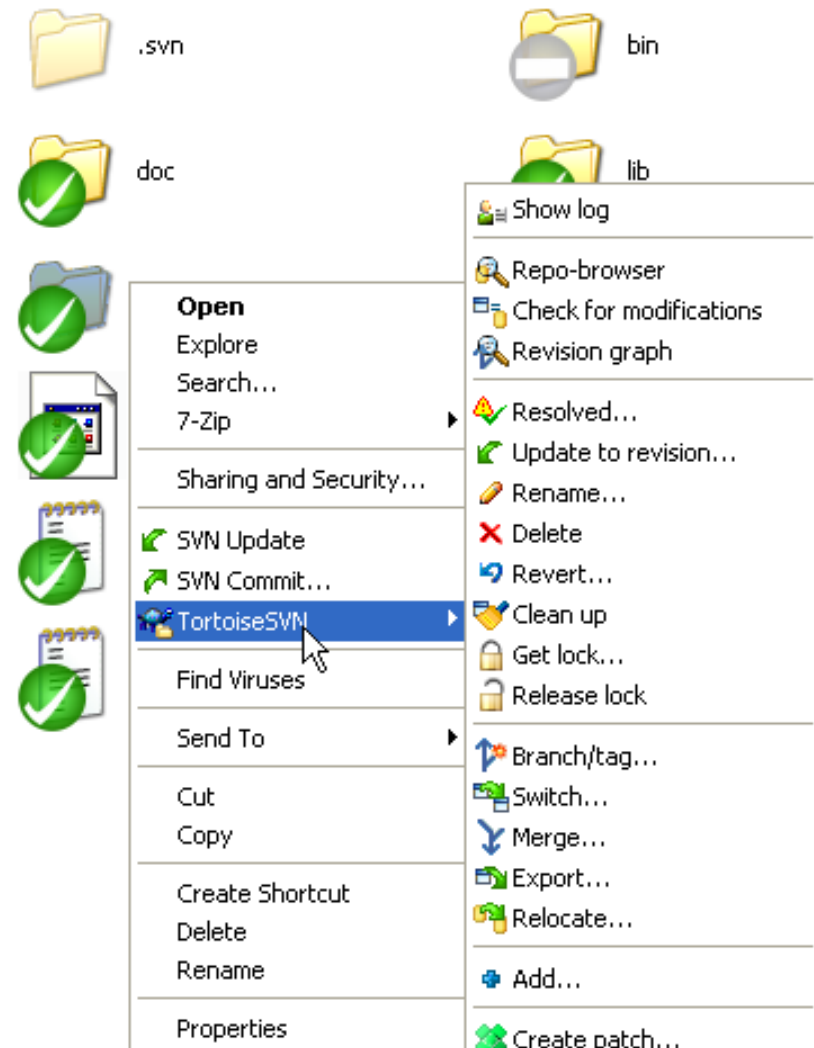
`svn+ssh://username@server/directory`

`http://server/xtra/directory`

`svn+ssh://bob@svn.cs.mcgill.ca/xtra/2008/cs361/team1`

SVN Client

- All OS: command line svn
- Windows : SVN Tortoise
- Eclipse : Subclipse
- NetBeans : built-in



SVN Tortoise

svn command

- The svn command is an all purposes tool. It contains all the necessary functionality to
 - ♦ **checkout** code from a repository
 - ♦ **adding** files to a repository
 - ♦ **update** a local repository
 - ♦ merge two revisions
 - ♦ compare two revisions
 - ♦ **commit** code to a repository
 - ♦ Etc.

■ You type in the *svn help* command to see

```
usage: svn <subcommand> [options] [args]
```

```
Subversion command-line client, version 1.2.3.
```

```
Type 'svn help <subcommand>' for help on a specific subcommand.
```

Most subcommands take file and/or directory arguments, recursing on the directories. If no arguments are supplied to such a command, it recurses on the current directory (inclusive) by default.

Available subcommands:

```
add
```

```
blame (praise, annotate, ann)
```

```
cat
```

```
checkout (co)
```

```
cleanup
```

```
commit (ci)
```

```
copy (cp)
```

```
...
```

Checking Out

```
svn checkout URL [PATH]
```

- To modify code in a repository, you need to check out a local copy of the code.

```
svn checkout  
  svn+ssh://adenau@svn.cs.mcgill.ca/xtra/mammoth  
  /trunk mammoth-trunk
```

```
svn add FILES
```

- To add a file to a repository, you need to first place it in your checkout directory (in the correct location).
- Then call the `svn add` command.
- The file will be added next time you commit your changes.

Committing

```
svn commit [PATH]
```

- Once you've tested your changes, you can commit them to the repository.
- When committing, you will be asked to supply a short message.
- This short message should explain what you are committing:
 - ◆ Changes you did
 - ◆ Reasons for the change
 - ◆ Bugs you fixed (including bug id if available)

Updating

```
svn update [PATH]
```

- Other people are continuously contributing to the svn repository.
- To update your code with their latest changes, just use the `svn update` command.
- If somebody changed lines in a file that you also changed, a conflict occurs.
 - ♦ The file is going to be tagged as in a conflicted state.
 - ♦ Before you can commit your changes, you need to resolve the conflict.

Resolving

```
svn resolved FILE
```

- Once both piece of code have been merge, the svn resolve command must be used to indicate the new state of the file.

Conflict Avoidances

- To minimize the risk of conflicts, some companies have established “manual” locking scheme.

Conflict Avoidances

- To minimize the risk of conflicts, some companies have established “manual” locking scheme.
- One of the most memorable is the stuffed toy locking system.
 - ◆ Only the person with the stuffed toy on his desk can commit his code to repository.
 - ◆ A programmer can “acquire” the toy by getting it from its designated storage.
 - ◆ Once he is finished committing his code, he must return the toy to its designated storage.
- Although this solution solves some problems of simultaneous commits, it
 - ◆ shares a lot of problems with file locking.
 - ◆ does not prevent conflicts from occurring, just reduces the chances.

```
svn status [PATH]
```

- For a given path, svn status will give the svn state of each file.
 - ♦ 'A' Added
 - ♦ 'C' Conflicted
 - ♦ 'D' Deleted
 - ♦ 'G' Merged
 - ♦ 'I' Ignored
 - ♦ 'M' Modified
 - ♦ 'R' Replaced
 - ♦ '?' item is not under version control
 - ♦ '!' item is missing
- More information about the output can be found by using `svn help status`.

Read a tutorial



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SVN Tutorial Sean Russell CIO Germano Software 60252 Rimfire Rd Bend OR 97702

- SourceSafe is the previous version control package solution from Microsoft, distributed with Visual Studio.
 - ♦ purely file locking mechanism.
 - ♦ tight integration with Visual Studio
 - ♦ works well for small teams
 - ♦ does not scale well for large teams

Visual Studio Team Foundation Server

- New solution from Microsoft for larger teams
 - ◆ source control
 - ◆ data collection
 - ◆ reporting
 - ◆ project tracking

- Perforce is the industry solution for revision control.
- It has an impressive client list
 - ◆ Activision, ATI, Cisco, EA, Ericsons, IBM, SCEA, etc
- Perforce supports several operating system and can integrate itself with several application.
 - ◆ Visual Studio / Eclipse / Xcode
 - ◆ Photoshop
 - ◆ 3DS Max, Maya
 - ◆ MS Office

This Weekend

- Continue trying out technologies.
- Start thinking about data structures.
- Meetings start Monday.
 - ◆ McConnell 322