



# **Software Engineering for Research Students**



A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines. Some nodes are solid grey circles, while others are dashed circles with a smaller solid circle inside. The lines are thin and grey, creating a web-like structure.

# Hello!

**I am Chris Kerslake**

**`chris.kerslake@sfu.ca`**



# Before we begin...

***This will be hands-on, so...***

1. Verify that everyone has the code from GitHub
2. <https://github.com/xmoduslearning/HillRepeats>
3. Verify that everyone can run the Python code.

```
4. > cd src
```

```
5. > python HillRepeats.py \
```

```
6.   ../data/activities/ubc_hill_repeats_2013-09-23.txt \
```

```
7.   ubc
```



**Disclaimer:**  
these are *my*  
opinions about  
software  
programming...

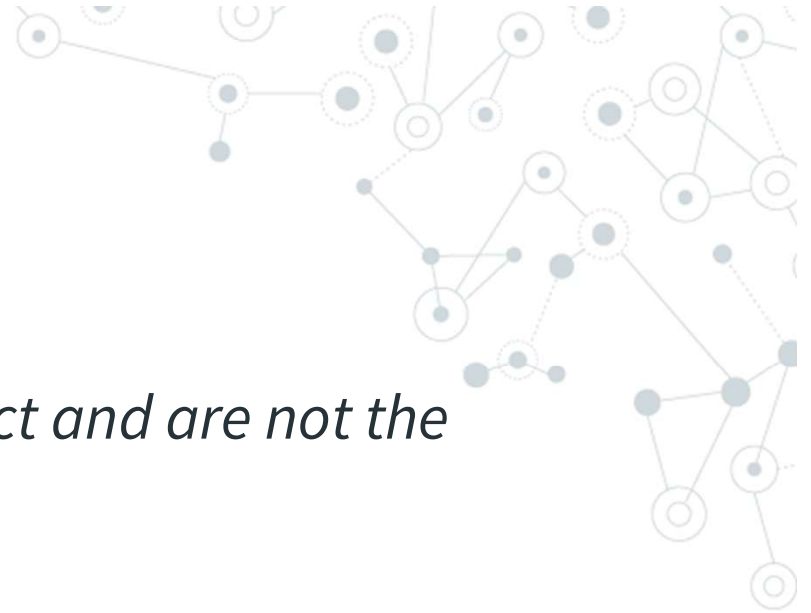


**Q:** What is your  
name, why are  
you at SFU and  
why this  
seminar?



# Why are you here?

1. *You've inherited a software project and are not the original author.*
2. *You're moving on and want to leave your software project to your successors.*
3. *Someone said you need to document your research software project.*
4. *Other?*



# TLDR

- Code explains the how, comments the why.
- Comment while you code.
- Document anything necessary for code.
- Document your build environment.
- Organize your project by software phase.
- Create tests to aid in refactoring.
- Version control your software.
- *Have someone else review and test, on a clean machine, before handing over.*

A decorative network diagram at the top of the slide. It features a horizontal line of nodes connected by lines. Some nodes are solid blue circles, while others are dashed circles. Below this line, a specific node is highlighted with a larger dashed circle and a solid blue circle inside it, containing the blue double quote symbol “.

“

***Software Engineering\*\****





“

# Technical Debt

- *Write the best code you can, at the time.*
- *Improve it when you know more or better.*
- *Don't write bad code and “hope” to fix it.*
- *There is no later.*

<https://www.youtube.com/watch?v=pqeJFYwnkjE>

A decorative header featuring a network diagram of interconnected nodes and lines. A central node is highlighted with a blue double quote icon ("").

“

**Code is the how.  
Comments should be why.**

90% of all code comments:

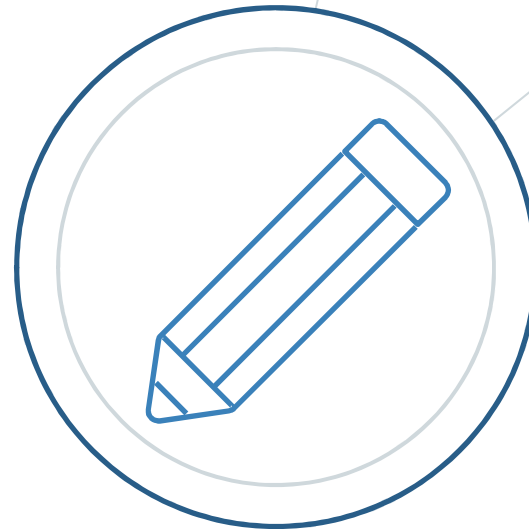




# Code Comments

- Keep them brief.
- Use liberally.
- Don't be excessive.
- They require maintenance.
- Comment while you code.

# Let's look at the comments.



**Find one  
comment  
you like.**

**Find one  
comment  
you don't  
like.**

**Find one  
comment  
you could  
make better.**



“

# Evolution of comments

- **No comments.**
- **Repeats code.**
- **Too many.**
- **Formulaic headers.**
- **Explains the why.**



“

**“Good code is  
self-documenting”**

A decorative header featuring a network diagram with nodes and connecting lines. A central node is highlighted with a blue double quote icon (").

“

# Documentation

- **Must be up to date.**
- **Requires maintenance.**
- **Ideally should be with the code.**





“

# What should you document?

- **Build environment.**
- **Data sources.**
- **Test procedures.**
- **Installation procedures.**
- **Monitoring procedures.**
- ***Code?***



“

# Folder Organization

- **/src**
- **/config**
- **/data**
- **/tests**
- **/docs**
- **/logs**



“

# Logging

- **Add logging when necessary**
- **Logging requires maintenance.**
- **Logs can expose data...**
- ***Necessary in production & remote.***

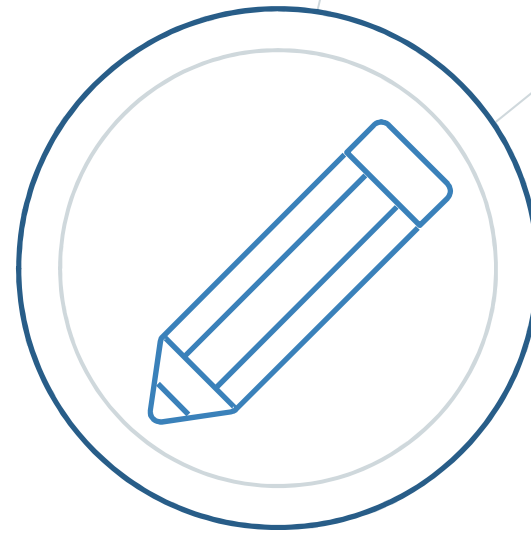
A decorative header featuring a network diagram with nodes and lines. A central node is highlighted with a blue double quote icon (").

“

# Configuration Files

- **Supports multiple phases.**
- **Supports multiple platforms.**
- **Replaces hardcoded values.**
- **Beware of password disclosure.**

**Let's  
remove  
some hard-  
coded  
values.**



**Let's  
replace the  
hard-coded  
hill value.**





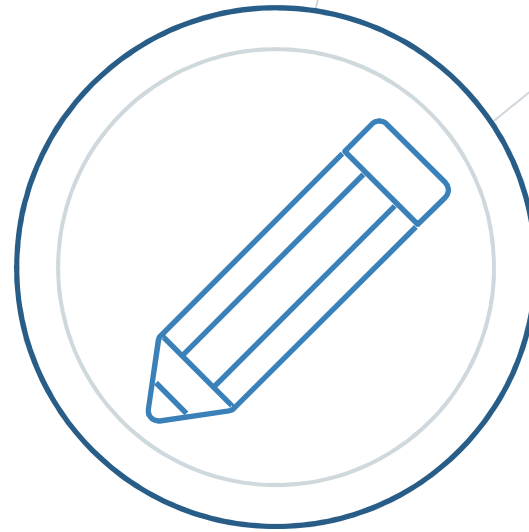
“

# Refactoring Code

- Fixing a bug.
- Adding a feature.
- Improving the code.

***Start with unit tests.***

**Let's fix  
some code.**



**Let's fix the  
"HACK".**





# Version Control

- **Be careful with passwords & keys.**
- **Backup your project!!!**
- **Comment why on check-in.**
- **Do it early & do it often.**
- **Make sure you have account password.**





“

## Green Field

**Before you hand the project over, have someone other than you, follow your explicit instructions to setup the dev, test and production environments and verify - before you leave.**

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“

Questions?

***Thank-you!***