Administrative Notes
January 25, 2018

- If you’re not comfortable moving around a lot, don’t sit in the last 3 rows today
- Everyone not in the last 3 rows needs a writing implement
- Please move your backpacks out of the aisle and ideally under the desk in front of you
- Reminder: reading quizzes due next Monday
- Reminder: Project groups due on Canvas by February 7
- Reminder: Midterm #1 Feb 1 in class
  - Come prepared for a seating chart
  - Do the practice exercises
Clicker grades are up after each class (either on that day or the day after)
  • Double check your grades to ensure that your clicker is being recorded!
  • We have quite a few clickers that are not registered to any student
Reminder: you generally have a week after you receive a grade to dispute it.
  • We release grades as soon as they are ready. Take a look on Canvas every so often (or turn on notifications from Canvas)
The Internet – Part 1
Learning Goals

- [CT Building Block] Define spam, phishing schemes, and cookies and give examples of each
- [CT Building Block] Tell whether a communication technology (Internet, radio, LAN, etc.) is synchronous or asynchronous
- [CT Building Block] Explain the roles of Internet addresses, domain names, and DNS servers in networking
- [CT Building Application] Explain how data is transferred from one location to another across networks, such as the Internet
- [CT Application] Understand some of the design features of TCP/IP networks, such as packets, routing, domain names, and hierarchical structure
- [CT Application] Explain the importance of headers
- [CT Impact] Describe some of the impacts of using cookies
- [CT Application] Describe why bias may exist in Internet items and news stories
- [CT Application] Evaluate the credibility of items found on the Internet
Tablets of Stone

- Information is sent on the Internet in small packages called *packets*
  - This information can be images, files, or anything else you want to send to someone else. Let’s call this information a *message*.

- Today, we will pretend to be computers/servers and mimic sending packets! We will pretend to be:
  - Packet senders
  - Packet receivers
  - Packet messengers
Tablets of Stone: Messengers

- Messengers pass packets from one computer to another
- With each received packet, a messenger will take the top card from the packet and do what it says:
  - Deliver the packet
  - Not deliver the packet
  - Or deliver the packet after the next received packet gets delivered

Everyone in the last 3 rows is a messenger

Computational Thinking
http://www.ugrad.cs.ubc.ca/~cs100
Computers break files into packets to send to each other

- Everyone else, pair up with the person next to you. Pairs only!
  - Pick one person to be person A and one person to be person B
- Each pair gets:
  - A party hat with a number: Messengers use this to identify you (e.g., the person with the hat is 1A while the other is 1B)
  - A message to send: a ~15 character sequence of letters, numbers, and symbols
  - Some tablets to write your message on
  - Instructions

Make sure only person A sees the message!
Tablets

- Use the tablets to transfer your message
- You can only put one letter, number, or symbol in each box
- To: the person you want to send it to—e.g., 13

<table>
<thead>
<tr>
<th>B</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>#</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
</tr>
</tbody>
</table>

To: 13
Activity Start

- Person A should have the tablets and the message and stay put.
- Person B should move back 3 rows and wear the party hat.
- Messengers, come to the front of the classroom.
- Senders, wave a paper in the air to ask the messengers to pass the tablet from you to your partner. See if you can communicate the message to your partner!
Clicker question

Did you successfully communicate the message?
A. Yes
B. No
Tablets of Stone Wrap Up

What did you learn?
Get back into pairs with your partner. **Write down** what algorithm you used to pass messages from one person to another. Messengers, join with a group of senders and receivers. When you are finished, trade algorithms with another group sitting near you.

Look for the following things:

- Does the other algorithm make sense to you?
- Is their algorithm essentially the same as yours?
- Would the other algorithm work in general? Why or why not?
Clicker Question

Does the other algorithm make sense to you?

A) Yes
B) No
Clicker Question

Was the other algorithm essentially the same as yours?

A) Yes
B) No
Clicker Question

Do you think that both algorithms would work in general?

A) Yes, both would work in general
B) Our algorithm would work in general, the other wouldn’t
C) The other algorithm would work in general, ours wouldn’t.
D) No, neither would work
What has the Internet done for me lately?

- The Internet is pretty complex. We’ll discuss its impacts and look at some of the basics that can help us understand it.
  - Spam
  - Phishing
  - Cookies
Phishing

• Phishing: “the activity of defrauding an online account holder of financial information by posing as a legitimate company.” [Google Search]

• There are several ways in which Phishing occurs. Knowing more about the Internet can help avoid it.
Motivation: Actual mail to John Podesta (Hillary Clinton’s campaign manager)

> Hi John
>
> Someone just used your password to try to sign in to your Google Account
> john.podesta@gmail.com.
>
> Details:
> Saturday, 19 March, 8:34:30 UTC
> IP Address: 134.249.139.239
> Location: Ukraine
>
> Google stopped this sign-in attempt. You should change your password immediately.
>
> CHANGE PASSWORD <https://bit.ly/1PibSU0>
>
> Best,
> The Gmail Team
> You received this mandatory email service announcement to update you about important changes to your Google product or account.

Clicker question: Should he click?   A. Yes   B. No
What about this one?

http://myaccount.google.com-securitysettingpage.tk/security/signinoptions/password?e=am9obi5wb2Rlc3RhQGdtYWlsLmNvbQ%3D%3D&fn=Sm9obiBQb2Rlc3Rh&n=Sm9obg%3D%3D&img=Ly9saDQuZ29vZ2xlXNlcmNvbnRlbnQuY29tLy1RZVIpHJkVGp2WS9BQUFBQUFBQUFBS9BQUFBQUFBOUFCTS9CQldVOVQ0bUZUWS9waG90by5qcGc%3D&id=1sutlodlwe

Should you click that one?

A. Yes       B. No
Phishing happens to us too!

Date: Tue, 16 Jan 2018 16:04:36
From: "Beardsley, Evan W." <evan_beardsley@mymail.eku.edu>
Subject: UBC E-mail User © Copyright 2018 University of British Columbia

Dear Colleagues

We have noticed too many phishing mails requesting for your personal information lately. Please do not adhere to their request. We have created an anti-phishing email login to prevent the phishing mails. Click Here to activate your Anti-phishing security.

We hope you find this transition newsletter useful.

Best wishes

ITS Help-Center
security@ubc.ca

Goes to vitorr.com (don’t go there)
A good place to start is to understand something about URLs and Domain Names.

Addresses are key to performing networking tasks:

- **e-mail addresses:** identify *people*
- **URLs:** identify *web pages*
- **domain names:** identify *computers*

Both e-mail addresses and URLs have domain names.
Breaking URLs down

Here’s a URL:

http://www.phdcomics.com/comics.php

Protocol         Domain       File, directory, and additional information

Most of the time the protocol is http (Hyper Text Transfer Protocol), but it can be other things. https means that it’s the secure hyper text transfer protocol
Clicker question

- www.google.ca is a…

A. URL
B. Domain name
C. Web page
D. IP address
Domain names form a hierarchy

- Each “.” separates a different level
- The farther toward the end, the higher the level
- Example: www.ugrad.cs.ubc.ca
  - The name of the computer is **www**
  - Which is part of the undergrad domain (**ugrad**)
    Which is part of the Computer Science Department domain (**cs**)
  - Which is part of the University of British Columbia domain (**UBC**)
  - Which is part of Canada (**ca**)

Computational Thinking
http://www.ugrad.cs.ubc.ca/~cs100
Domain Names Pictorially

- These names form a *hierarchy*
- *example names:* cs.ubc.ca, google.com, ugrad.cs.ubc.ca
Group Exercise

Draw the hierarchical relationship between domain names that can be inferred from the following domains:

- www.ubc.ca
- www.cs.ubc.ca
- ugrad.cs.ubc.ca
- ct.cs.ubc.ca
- interchange.ubc.ca
Solution

- .
- ca
- ubc.ca
  - www.ubc.ca
  - cs.ubc.ca
  - interchange.ubc.ca
  - www.cs.ubc.ca
  - ugrad.cs.ubc.ca
  - ct.cs.ubc.ca
Do you remember the discussion in class about Google and fake news?
Group exercise

Draw the hierarchies for www.cnn.com and cnn.com.de

Clicker question: are they likely to be related?

A. Yes
B. No
cnn.com.de vs. www.cnn.com

cnn.com.de is not the same as www.cnn.com!

**cnn.com**
- .
- com
- cnn.com
- www.cnn.com

**cnn.com.de**
- .
- de
- com.de
- cnn.com.de
Fun Fact

• Did you know that you can look up who owns a website?
• “whois” is a command that lets you look up who owns a website.
• Here is one website that will run whois: http://whois.domaintools.com
Clicker question

Web pages are written in HTML, then delivered to me with formatting, looking like a picture. Which computer converts the HTML language to the finished product?

(A) my computer
(B) the server
(C) some computer somewhere else connected through the internet
(D) no idea
Breaking down the files

After the domain name, comes the file organization. It’s in a hierarchy as well.

http://imgs.xkcd.com/comics/phishing_license.png

Protocol  Domain  Directory  file
Exercise: file hierarchies

Draw a hierarchical diagram showing relationships between folders and files that can be inferred from the following URLs.

hkin.educ.ubc.ca/ALUMNI/Home.html
hkin.educ.ubc.ca/ALUMNI/documents/OurPast.html
hkin.educ.ubc.ca/ALUMNI/documents/sixty.htm
hkin.educ.ubc.ca/ALUMNI/PDFs/2008 Grads.pdf

(Hint: the root of the diagram is the folder called "ALUMNI".)
File hierarchies solution

- ALUMNI
  - Home.html
  - documents
    - OurPast.html
    - sixty.htm
  - PDFs
    - 2008 Grads.pdf
Sometimes there can be additional information in a URL

Let’s look at

So far we’ve covered everything through:
http://www.phdcomics.com/comics/archive.php

Everything after a “?” is data needed to process the request. In this case, it’s the ID of the comic that the user has requested.
So does this URL have any official connection with google?

http://myaccount.google.com-securitysettingpage.tk/security/signinoptions/password?e=am9obi5wb2Rlci3RhQGdtYWlsLmNvbQ%3D%3D&fn=Sm9obiBQb2Rlci3Rh&n=Sm9obg%3D%3D&img=Ly9saDQuZ29vZ2xlIdXNlcmlnbnRlbmQuY29tLy1RZVlPbHJkVGp2WS9BQUFBQUFBQUFBQUFBQUFCTS9CQldVOVQ0bUZUWS9waG90by5qcGc%3D&id=1sutlodlwe

A. Yes  B. No
MIDTERM #1 covers material through here!