

# PROGRAMMING BASICS

Intro to the command line

# Purpose of Today's Class

In today's class we learn about command line environments, getting started with GitHub, and basic programming logic.

# What we will Accomplish Today

- We will create our own GitHub profile
- Learn about the basics of a command line environment
- We will use cloud9 to play around with our Linux environment
- Learn some core programming concepts
- Write our first program
- Run our first program
- Add our files to GitHub
- Learn how to set up our own environment on our home machine

# Today We Will Learn How Learn to Code



# Why Code?

“I think everyone should get a little exposure to computer science because it really forces you to think in a slightly different way, and it’s a skill that you can apply in life in general, whether you end up in computer science or not” - Tony Hsieh

“Software touches all of these different things you use, and tech companies are revolutionizing all different areas of the world...from how we shop to how farming works, all these things that aren't technical are being turned upside down by software. So being able to play in that universe really makes a difference” - Drew Houston

“Coding is today’s language of creativity. All our children deserve a chance to become creators instead consumers of computer science” - Maria Klawe

# What do you wish you knew before you got started coding?

“Be more fearless and break your computer. You learn the most in the debugging” – Tanya Tarr

“Learning a new pattern is much more valuable than a new language” – Travis Hoppe

“Even the most experienced Developers utilize a lot of trial and error. Struggling through code and asking google is natural” – Nicholas Marcouiller

# My Story

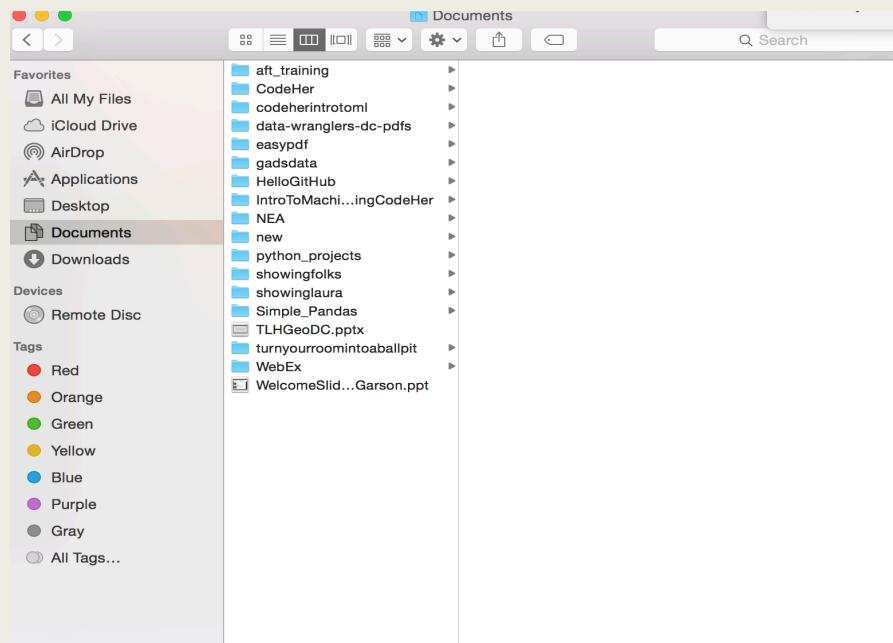


# Introductions

- Name
- Favorite movie
- What brings you here today

# What is the command line?

- The command line is a way of interacting with the computer but without the graphical interface we are used to in programs like finder on the computer



```
JessicasMacBook:documents jessicagarson$ ls
CodeHer
HelloGitHub
IntroToMachineLearningCodeHer
NEA
Simple_Pandas
TLHGeoDC.pptx
WebEx
WelcomeSlide For DC - Jessica Garson.ppt
aft_training
codeherintrotoml
data-wranglers-dc-pdfs
easypdf
gadsdata
new
python_projects
showingfolks
showinglaura
turnyourroomintoaballpit
~$TLHGeoDC.pptx
~$WelcomeSlide For DC - Jessica Garson.ppt
~$aft_first_model.xlsx
~$codeher_first_model.xls
JessicasMacBook:documents jessicagarson$
```

# Linux, Unix and Other Systems

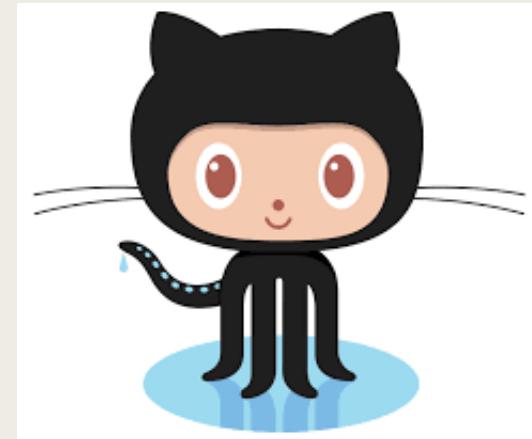


Linux



UNIX

# Git vs Github



# What is Open Source software?

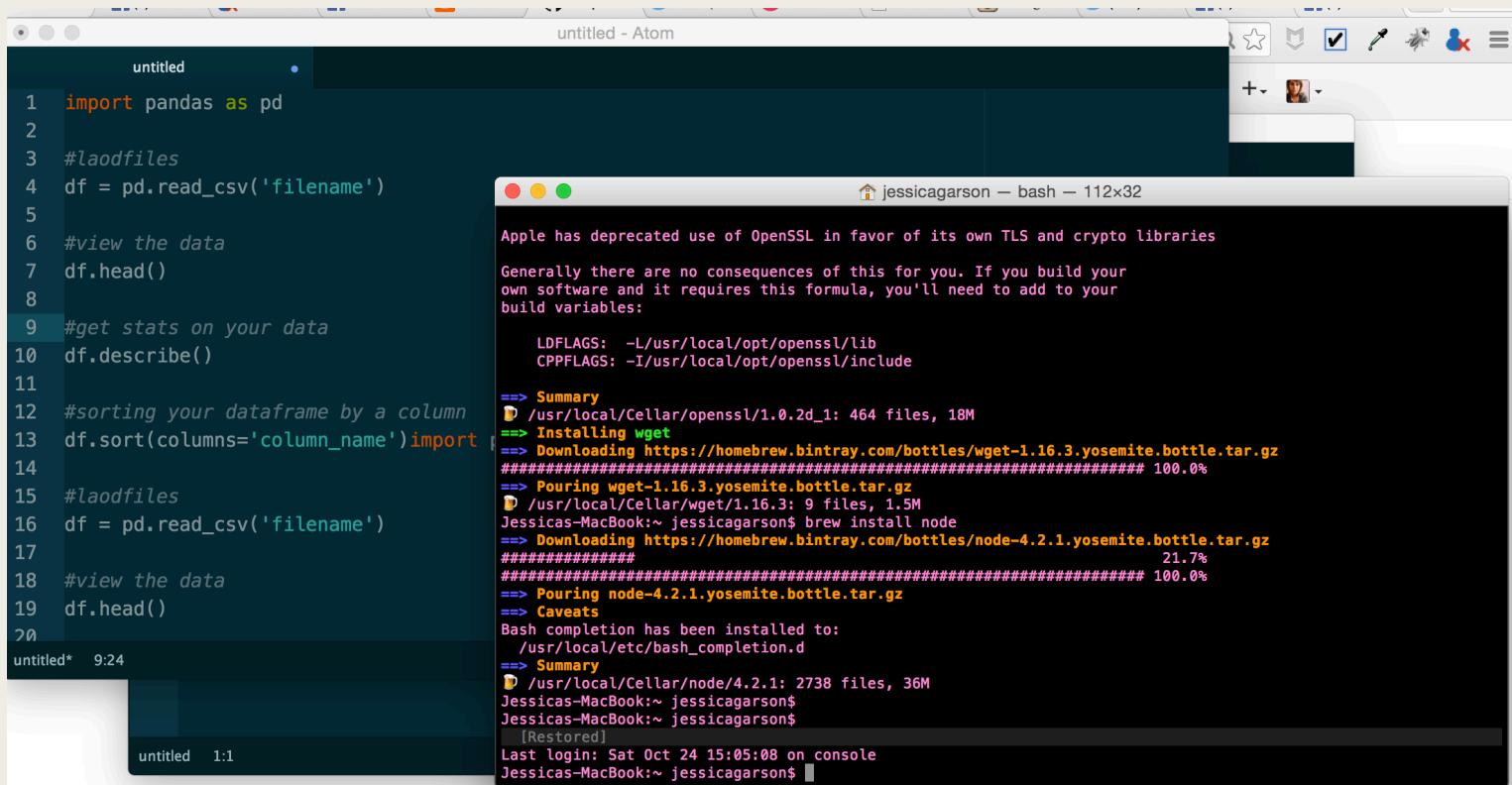


**open source**

# A few other key terms

- Bash scripting - A script for a computer tells the computer what it should do or say. In the context of Bash scripts we are telling the Bash shell what it should do. A Bash script is a plain text file which contains a series of commands.
- Shell - A shell is a program that provides the traditional, text-only user interface for Linux and other Unix-like operating systems.

# What do you need to code?



The image shows a Mac desktop with two windows open. On the left is an Atom code editor window titled "untitled". It contains Python code for data analysis:

```
1 import pandas as pd
2
3 #loadfiles
4 df = pd.read_csv('filename')
5
6 #view the data
7 df.head()
8
9 #get stats on your data
10 df.describe()
11
12 #sorting your dataframe by a column
13 df.sort(columns='column_name')import
14
15 #loadfiles
16 df = pd.read_csv('filename')
17
18 #view the data
19 df.head()
20
```

The status bar at the bottom of the Atom window shows "untitled\* 9:24" and "untitled 1:1".

On the right is a terminal window titled "jessicagarson — bash — 112x32". It displays the output of a Homebrew upgrade process:

```
Apple has deprecated use of OpenSSL in favor of its own TLS and crypto libraries
Generally there are no consequences of this for you. If you build your
own software and it requires this formula, you'll need to add to your
build variables:

LDFLAGS: -L/usr/local/opt/openssl/lib
CPPFLAGS: -I/usr/local/opt/openssl/include

==> Summary
⇒ /usr/local/Cellar/openssl/1.0.2d_1: 464 files, 18M
==> Installing wget
==> Downloading https://homebrew.bintray.com/bottles/wget-1.16.3.yosemite.bottle.tar.gz
#####
21.7%
#####
100.0%
==> Pouring wget-1.16.3.yosemite.bottle.tar.gz
⇒ /usr/local/Cellar/wget/1.16.3: 9 files, 1.5M
Jessicas-MacBook:~ jessicagarson$ brew install node
==> Downloading https://homebrew.bintray.com/bottles/node-4.2.1.yosemite.bottle.tar.gz
#####
21.7%
#####
100.0%
==> Pouring node-4.2.1.yosemite.bottle.tar.gz
==> Caveats
Bash completion has been installed to:
  /usr/local/etc/bash_completion.d
==> Summary
⇒ /usr/local/Cellar/node/4.2.1: 2738 files, 36M
Jessicas-MacBook:~ jessicagarson$
Jessicas-MacBook:~ jessicagarson$ [Restored]
Last login: Sat Oct 24 15:05:08 on console
Jessicas-MacBook:~ jessicagarson$
```

# Let's make our own GitHub profile

[www.github.com](http://www.github.com)

The screenshot shows a GitHub profile page for a user named Jessica Garson. The top navigation bar includes links for Contributions, Repositories, Public activity, and Edit profile. Below the header, there is a large profile picture of Jessica Garson, her name, and her GitHub handle (@jessicagarson). Her bio information includes her affiliation with NEA, location in Washington, DC, and email (jessica.garson@gmail.com). It also notes that she joined GitHub on Jan 5, 2014. Key statistics at the bottom of the bio section are 53 Followers, 14 Starred repositories, and 52 Following users. The main content area is divided into sections: Popular repositories (listing TwitterBot, Simple\_Pandas, intro\_to\_command\_line\_git, MachineLearningFridays, and MovieSentiment) and Repositories contributed to (listing burson\_tools). A prominent feature is the Contributions grid, which shows activity levels by month (Oct to Sep) and day of the week (M, W, F). A legend indicates that darker shades of green represent higher contribution counts. A summary note at the bottom of the grid states: "Summary of pull requests, issues opened, and commits. Learn how we count contributions."

# Let's Create Our Cloud 9 account

<https://c9.io/web/sign-up/free>



The image shows a screenshot of the Cloud 9 landing page. The background is a light blue gradient. At the top center is the Cloud 9 logo, which consists of a white cloud icon with a large number '9' inside it, followed by the word 'Cloud9' in a smaller font. Below the logo, the text 'Start Coding In 30 Seconds' is displayed in a large, white, sans-serif font. Underneath this text is a horizontal line. Below the line, the text 'Sign up with Github, Bitbucket or Email' is shown in a smaller, white, sans-serif font. At the bottom of the page, there are two social media integration buttons: one for GitHub (with the GitHub logo) and one for Bitbucket (with the Bitbucket logo). Both buttons are white with black text.

Start Coding In 30 Seconds

Sign up with Github, Bitbucket or Email

 GitHub     Bitbucket

# Activity – 20 Questions

Let's as a class play a game

If you don't remember how to play 20 questions here is a quick recap:

One person thinks of an object and the other player gets to guess up to 20 questions to guess the object

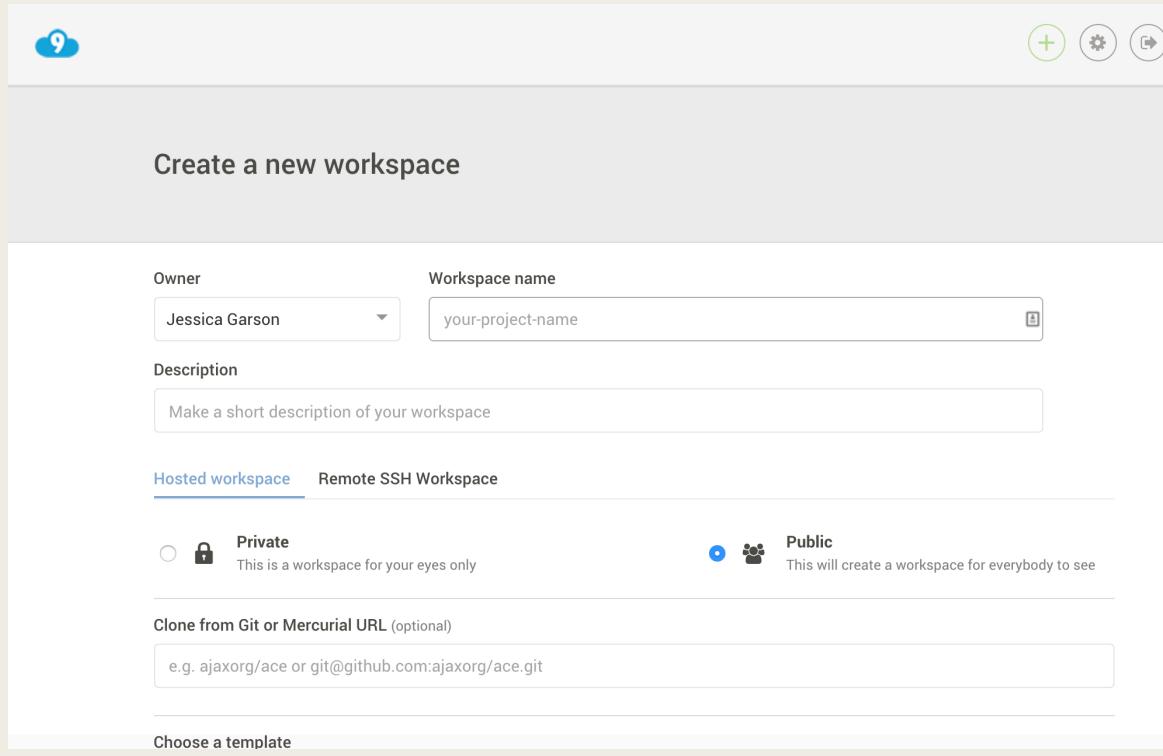
# Debrief

- What logic did you use to help make a guess?
- What strategies were effective?
- What strategies proved ineffective?

# Computer Concepts We Used

- Computational thinking
- Linear search
- Binary search
- Divide and conquer
- Comparing algorithms

# Setting Up in Cloud 9



The screenshot shows the Cloud 9 workspace creation interface. At the top, there's a header with a cloud icon and three circular buttons (green plus, gear, and arrow). Below the header, the title "Create a new workspace" is displayed. The form fields include "Owner" (set to Jessica Garson), "Workspace name" (input field containing "your-project-name"), and "Description" (input field with placeholder "Make a short description of your workspace"). There are two tabs at the bottom: "Hosted workspace" (selected) and "Remote SSH Workspace". Under "Hosted workspace", there are two options: "Private" (radio button, description: "This is a workspace for your eyes only") and "Public" (radio button, description: "This will create a workspace for everybody to see"). A "Clone from Git or Mercurial URL (optional)" input field contains "e.g. ajaxorg/ace or git@github.com:ajaxorg/ace.git". A "Choose a template" section is also present.

Create a new workspace

Owner: Jessica Garson

Workspace name: your-project-name

Description: Make a short description of your workspace

Hosted workspace    Remote SSH Workspace

**Private**  
This is a workspace for your eyes only

**Public**  
This will create a workspace for everybody to see

Clone from Git or Mercurial URL (optional)  
e.g. ajaxorg/ace or git@github.com:ajaxorg/ace.git

Choose a template

# Where am I?

pwd

```
jessicagarson1:~/workspace $ pwd  
/home/ubuntu/workspace  
jessicagarson1:~/workspace $ █
```

Show the manual page for a command  
man

```
jessicagarson1:~/workspace/class $ man pwd  
jessicagarson1:~/workspace/class $ █
```

# Make a new directory

mkdir

```
jessicagarson1:~/workspace $ mkdir class  
jessicagarson1:~/workspace $ █
```

# Change Directory

```
cd directory_name
```

```
jessicagarson1:~/workspace $ cd class  
jessicagarson1:~/workspace/class $ █
```

Make new file  
touch file\_name

```
jessicagarson1:~/workspace/class $ touch new_file.txt
jessicagarson1:~/workspace/class $ █
```

# List contents of a directory

ls

```
jessicagarson1:~/workspace/class $ ls  
new_file.txt  
jessicagarson1:~/workspace/class $ █
```

# List the longer contents of a directory

ls -l

```
jessicagarson1:~/workspace/class $ ls -l
total 8
drwxr-xr-x 2 ubuntu ubuntu 4096 Dec 17 02:29 dec/
-rw-r--r-- 1 ubuntu ubuntu   310 Nov  6 01:07 pythonsecondfile.py
```

# Remove a File

rm

```
jessicagarson1:~/workspace/class $ rm jess.txt  
jessicagarson1:~/workspace/class $ █
```

# Move a file

mv

```
jessicagarson1:~/workspace/class $ mv helloworld.py dec/helloworld.py  
jessicagarson1:~/workspace/class $ █
```

Clear the contents of command line window  
clear

```
jessicag arson1:~/workspace/class $ clear█
```

# Create a tree diagram of contents

## Tree

```
jessicagarson1:~/workspace/class $ tree
.
└── dec
    └── helloworld.py
    └── pythonsecondfile.py

1 directory, 2 files
```

Remove a directory

rm -r dirname

```
jessicagarson1:~/workspace/class $ rm -r dec  
jessicagarson1:~/workspace/class $ █
```

# Read a file cat

```
jessicagarson1:~/workspace/class $ cat pythonsecondfile.py
name_of_student = "Jess"
print name_of_student

statement = "Hello {0}, it's nice to meet you".format(name_of_student)
print statement

color = raw_input("Whats your favorite color? ")
response = "Well {0}, {1} is a great color, nice to meet you, have a great day".format(name_of_student, color)
```

Tells you how many lines, words and characters there are in a file

wc

```
jessicagarson1:~/workspace/class $ wc pythonsecondfile.py  
8 43 310 pythonsecondfile.py
```

# A few tricks

- Tab complete
- The up arrow
- The down arrow

# Some key commands for changing directories

```
jessicagarson1:~/workspace/class $ cd ..
jessicagarson1:~/workspace $ cd
jessicagarson1:~ $ █
```

# Let's Play Around On The Command Line

- Let's take a few minutes to create a few files, move some files and generally play around to get to know the command line.

# Our First Python Program



# Our First Python Program

```
1 print "Hello World"  
2 |
```

# Running our first program

```
jessicagarson1:~/workspace/class $ python helloworld.py  
hello world
```

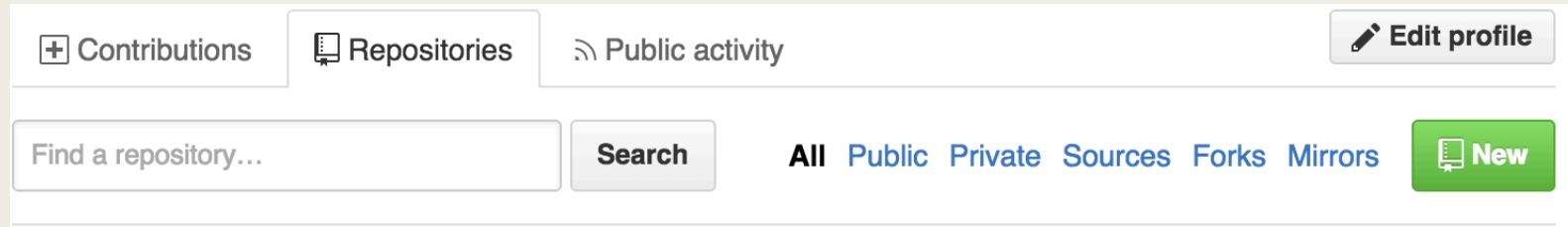
# Our 2<sup>nd</sup> Python Program

```
1 name_of_student = "Jess"
2 print name_of_student
3
4 statement = "Hello {0}, it's nice to meet
• you".format(name_of_student)
5 print statement
6
7 color = raw_input("Whats your favorite color? ")
8 response = "Well {0}, {1} is a great color, nice to meet
• you, have a great day".format(name_of_student, color)
9 print response
10
```

# Let's play and around and adjust the 2<sup>nd</sup> program

- Make changes a you see fit
- Run the program when you are ready
- Let me know if you have any questions

# Let's add our files to github



# Do This at Home

## Shell Environments

- On a mac – there is a Linux environment that comes pre-installed called the terminal
  - *To get to the terminal go to finder select utilities and inside the folder you should*
- On a PC – There are many options but I really like babun - <http://babun.github.io/>

## Text Editors

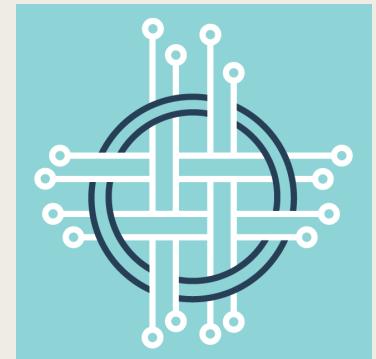
- Sublime Text - <http://www.sublimetext.com/>
- Atom - <https://atom.io/>
- Notepad ++ for PC only - <https://notepad-plus-plus.org/>

# The coolest thing about DC right now

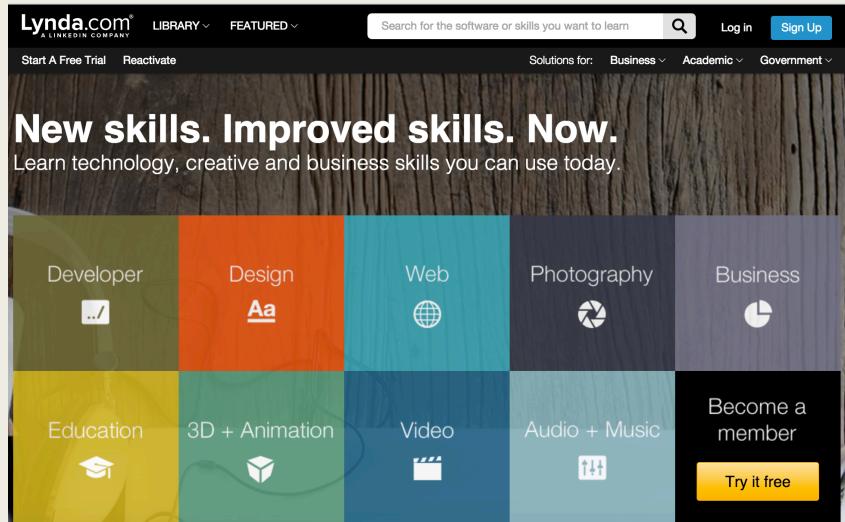
CODE  
FOR  
PROGRESS\_

HACK  
AND  
TELL

Data Community DC



# What Resources Does The Library Offer?



# Other Classes in this Series



# Resources for Learning How to Code

- What have you tried?
- What's worked well for you?
- What hasn't worked for you?
- What can we try?

# Questions, Comments, Feedback

- Let us know if you have any

# Contact

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