In and Out

"It is fatal to enter a war without the will to win it."

- Douglas MacArthur

Cybersecurity

Linux 2 Day 3

Today’s Objectives

By the end of class, you will be able to:

- Explain the relationship between file descriptors and data streams
- Use redirection between file descriptors and data streams
- Perform the same tasks multiple times with for loops

I/O Data Streams, File Descriptors, and Redirection

I/O Data Streams

A data stream is a way to describe channels of data as they are processed and moved through a system.

Used in Linux to move data from one processor / program to another. Three most used data streams are:

stdin - used to steam input data

stdout - used to steam output data

stderr - used to steam error data

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I/O Data Streams

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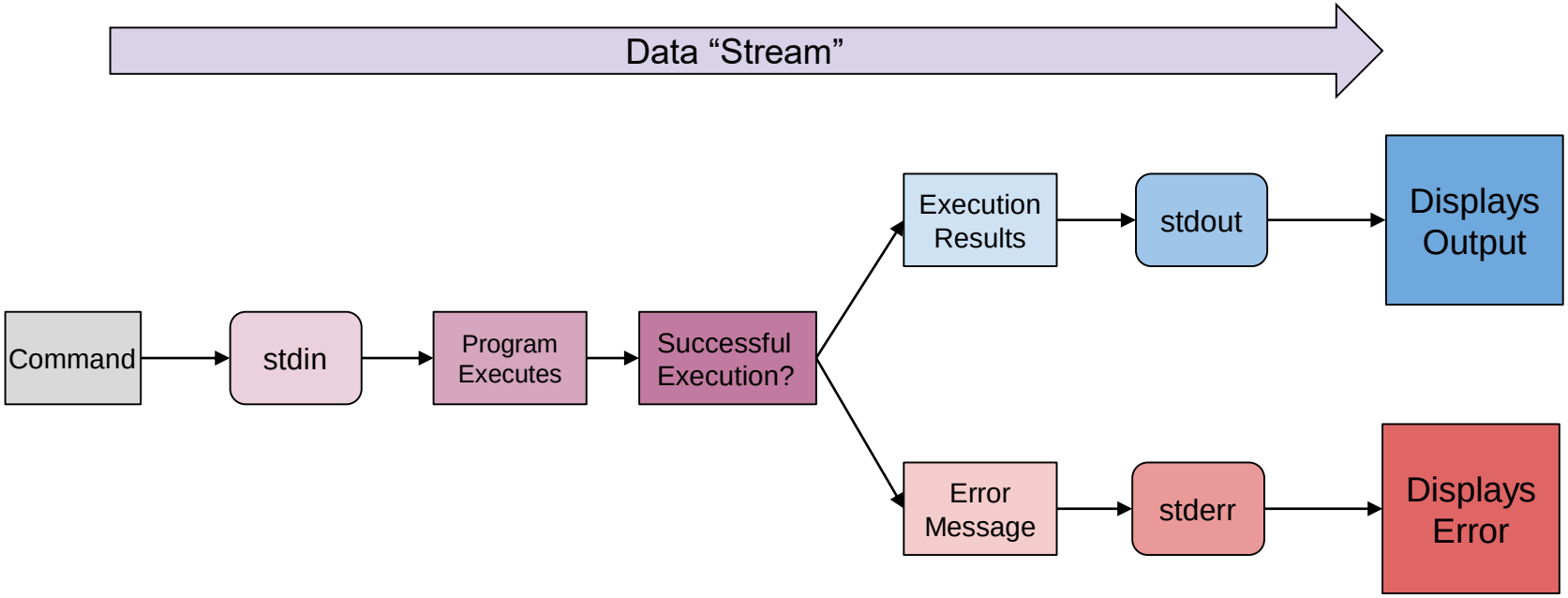
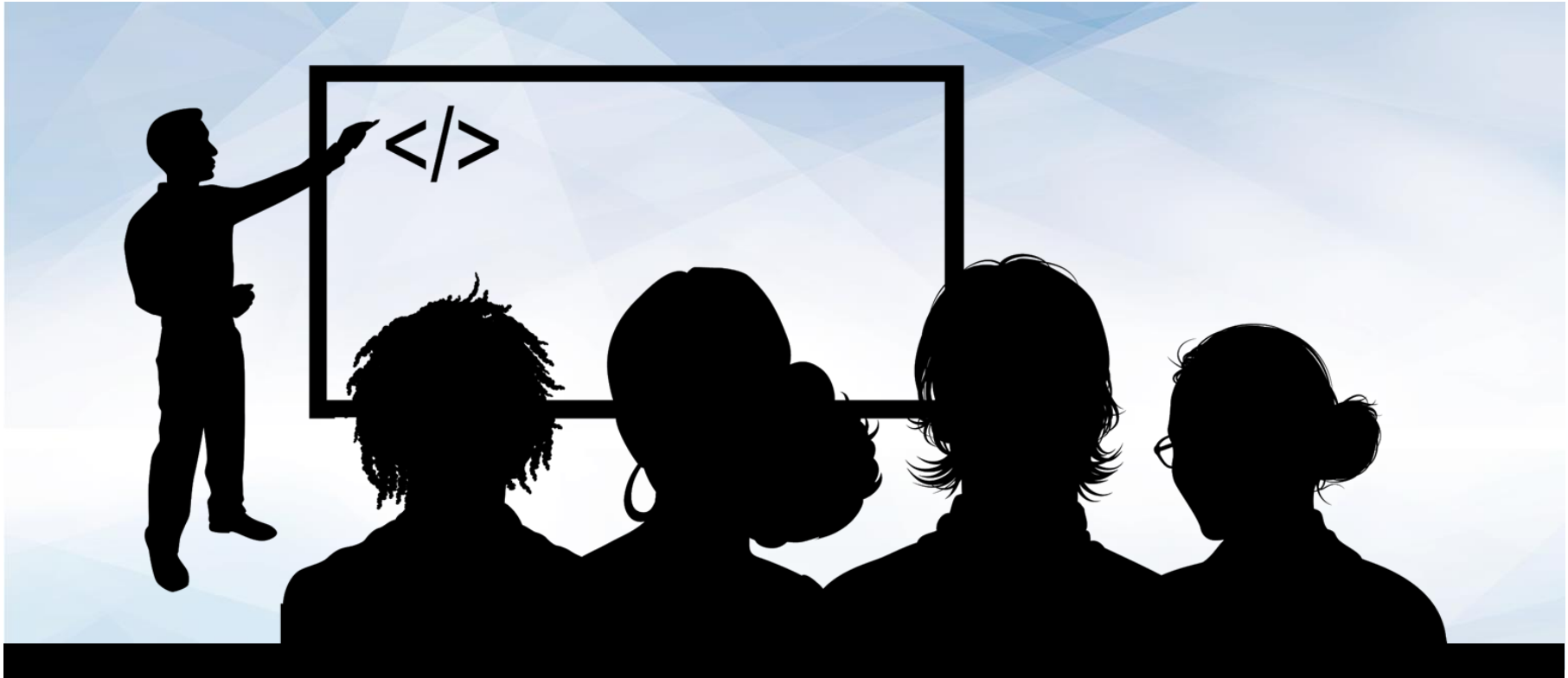




Instructor Demonstration

I/O Streams, File Descriptions and Redirections

Activity: Cat Whisperer

In this activity, you will use terminal to practice using stdin and stdout redirections with the cat command.

Activities/01_Stu_cat_Whisperer/Unsolved/README

Suggested Time:
20 Minutes

Your Turn: Cat Whisperer

Instructions

Run the command cat < /etc/passwd.

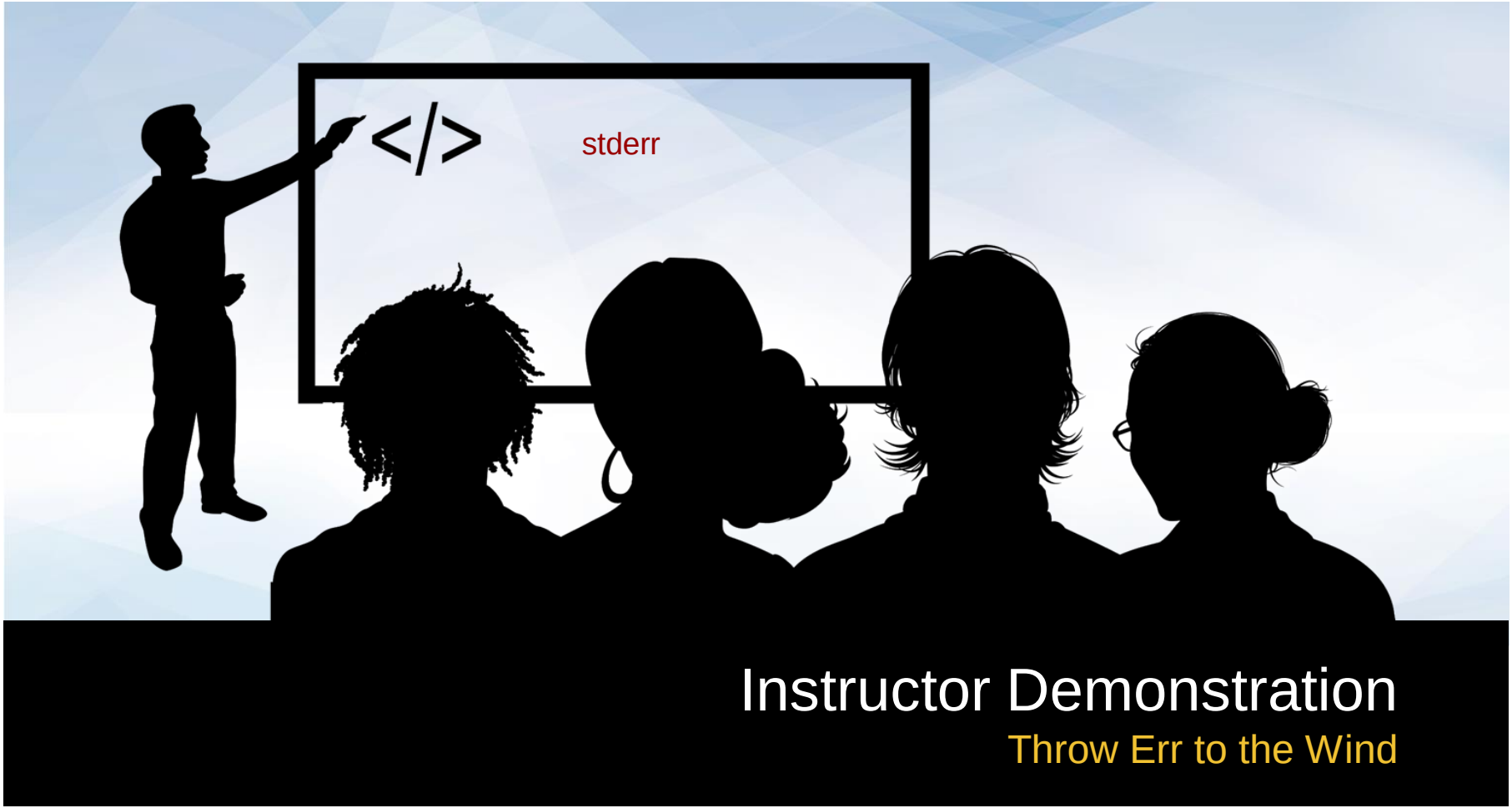
- ☐ What do you see?
- ☐ How is this different from cat /etc/passwd?
- ☐ Rewrite this command using the file descriptor for stdin.

Next, run: cat << EOF

- ☐ After entering this command, you will get a prompt because the cat program is now waiting for your input.
- ☐ Enter a few lines of text, hitting the return key each time.
- ☐ After a few lines of text, type EOF and hit return. What happens?
- ☐ Explain what you think EOF means.

Bonus: now run: cat << EOF > my_file.txt

- ☐ How is this different from just cat << EOF
- ☐ Describe in detail what will happen when you complete this command.



Instructor Demonstration

Throw Err to the Wind

Throw Err Demo Summary

sudo file $(find . -iname '*.txt') 2> /dev/null > ~/Desktop/text_files ; tail ~/Desktop/text_files

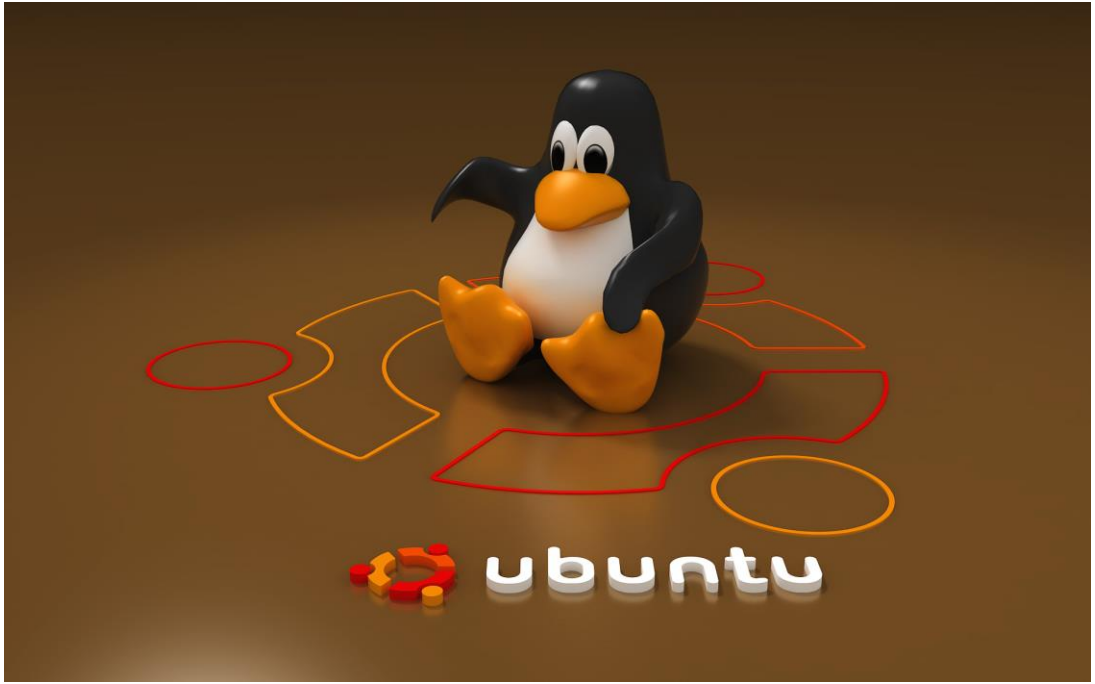
- $ () for command expansion
- . to reference your current location
- * expands to any number of characters
- 2> redirects stderr to dev/null in order to hide errors
- > redirects stdout to new file
- ~ expands to the home path of the user
- \ escapes the space in the file name
- ; runs the tail command while the find command is still running

Today’s Objectives

By the end of class, you will be able to:

- [x] Explain the relationship between file descriptors and data streams
- [x] Use redirection between file descriptors and data streams
- [ ] Perform the same tasks multiple times with for loops
- [ ] Collect user input through script arguments

Take A Beak



for loops

You’ll often want to perform the same tasks multiple times within a script.

For loops

Want to perform the same task within a script numerous times?

Write a script that does each task explicitly?

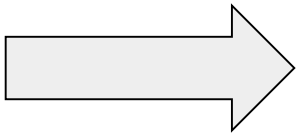
Copy and paste whole blocks of code?

These solutions are not maintainable, they don't scale well, and they're error prone.

for loops allow you to perform the same tasks multiple times without repeating a block of code.

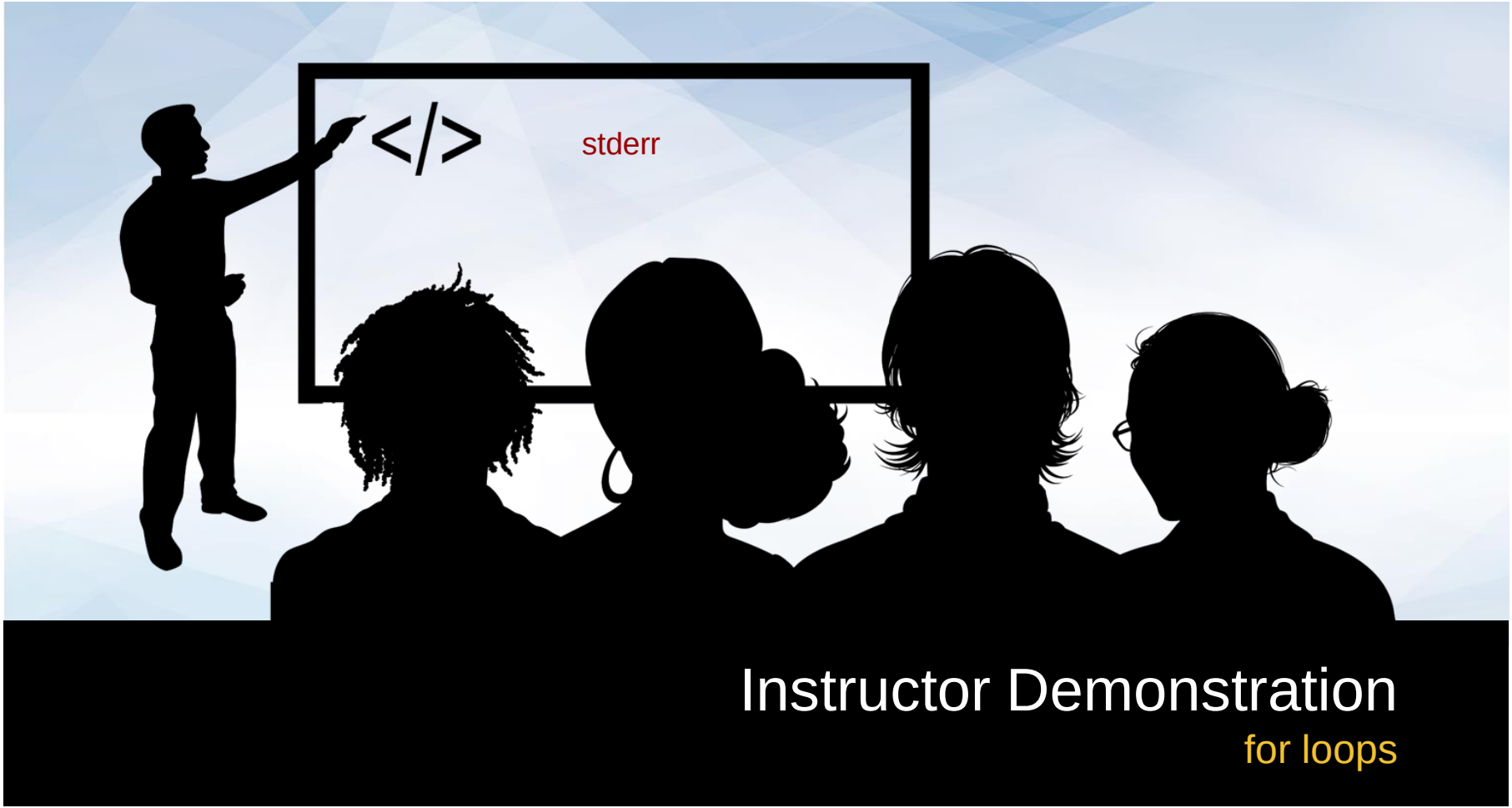
For loops syntax

```
echo "Hello, Moe!"
echo "Hello, Larry!"
echo "Hello, Curly!"
```



```
for NAME in "Moe" "Larry" "Curly"
do
  echo $NAME
done
```

- Begins with VAR_NAME in LIST
- The list can be a series of strings
- The keywords do and done mark the beginning/end of the for loop
- Everything in between do and done runs once for each element of the list
- Each time the code block runs, NAME changes to the next name in the list



Instructor Demonstration

for loops

Activity: First Steps with For

In this activity, you will use for loops to automatically create a directory tree.

Activities/03_Stu_First_Steps_with_For/Unsolved/README

Suggested Time:
20 Minutes

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