MINI- PROJECT -1

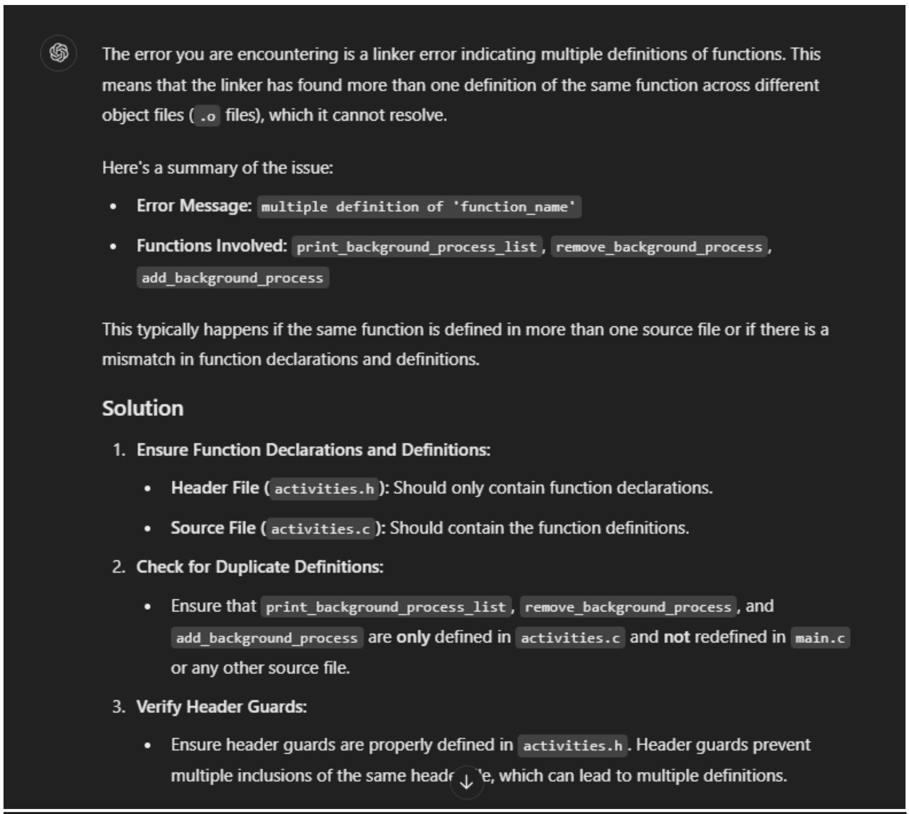
Used ai tools such as chatgpt and blackbox.

Certain links:

https://chatgpt.com/share/66e44451-0e30-8011-928e-bea508feba04

I was able to make ctrl z work sperately but not when combined with my whole code , it went into infinite loop.

https://chatgpt.com/share/66e444d5-636c-8011-84b5-5ecf8431a625



The error you are encountering is a linker error indicating multiple definitions of functions. This means that the linker has found more than one definition of the same function across different object files (`.o` files), which it cannot resolve.

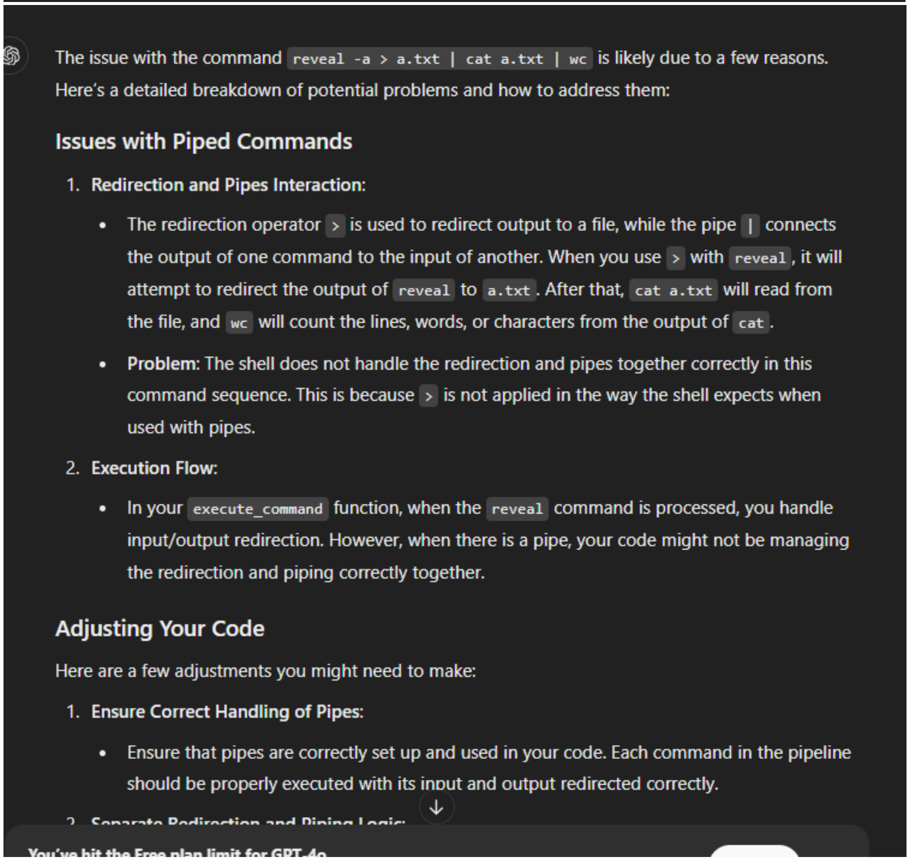
Here's a summary of the issue:

- **Error Message:** `multiple definition of 'function_name'`
- **Functions Involved:** `print_background_process_list`, `remove_background_process`, `add_background_process`

This typically happens if the same function is defined in more than one source file or if there is a mismatch in function declarations and definitions.

Solution

1. **Ensure Function Declarations and Definitions:**
   - **Header File (`activities.h`):** Should only contain function declarations.
   - **Source File (`activities.c`):** Should contain the function definitions.
2. **Check for Duplicate Definitions:**
   - Ensure that `print_background_process_list`, `remove_background_process`, and `add_background_process` are **only** defined in `activities.c` and **not** redefined in `main.c` or any other source file.
3. **Verify Header Guards:**
   - Ensure header guards are properly defined in `activities.h`. Header guards prevent multiple inclusions of the same header file, which can lead to multiple definitions.



The issue with the command `reveal -a > a.txt | cat a.txt | wc` is likely due to a few reasons. Here's a detailed breakdown of potential problems and how to address them:

Issues with Piped Commands

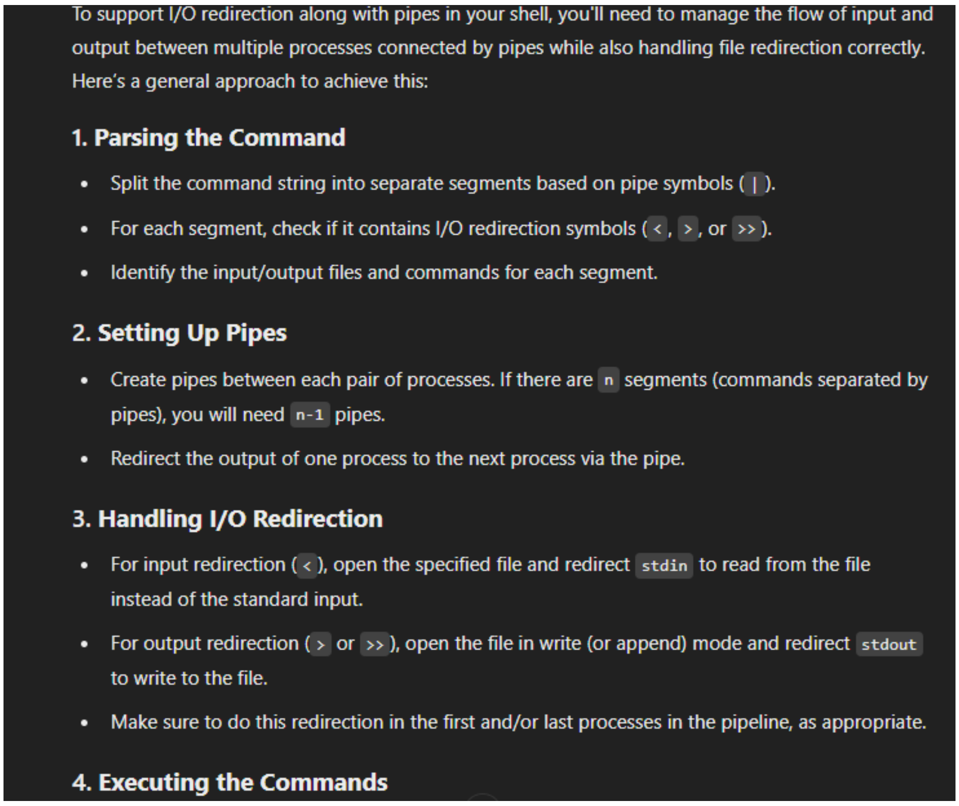
1. **Redirection and Pipes Interaction:**
   - The redirection operator `>` is used to redirect output to a file, while the pipe `|` connects the output of one command to the input of another. When you use `>` with `reveal`, it will attempt to redirect the output of `reveal` to `a.txt`. After that, `cat a.txt` will read from the file, and `wc` will count the lines, words, or characters from the output of `cat`.
   - **Problem:** The shell does not handle the redirection and pipes together correctly in this command sequence. This is because `>` is not applied in the way the shell expects when used with pipes.
2. **Execution Flow:**
   - In your `execute_command` function, when the `reveal` command is processed, you handle input/output redirection. However, when there is a pipe, your code might not be managing the redirection and piping correctly together.

Adjusting Your Code

Here are a few adjustments you might need to make:

1. **Ensure Correct Handling of Pipes:**
   - Ensure that pipes are correctly set up and used in your code. Each command in the pipeline should be properly executed with its input and output redirected correctly.
2. **Separate Redirection and Piping Logic:**

You've hit the Free plan limit for GPT-4o.


To support I/O redirection along with pipes in your shell, you'll need to manage the flow of input and output between multiple processes connected by pipes while also handling file redirection correctly. Here's a general approach to achieve this:

1. Parsing the Command

- Split the command string into separate segments based on pipe symbols (`|`).
- For each segment, check if it contains I/O redirection symbols (`<`, `>`, or `>>`).
- Identify the input/output files and commands for each segment.

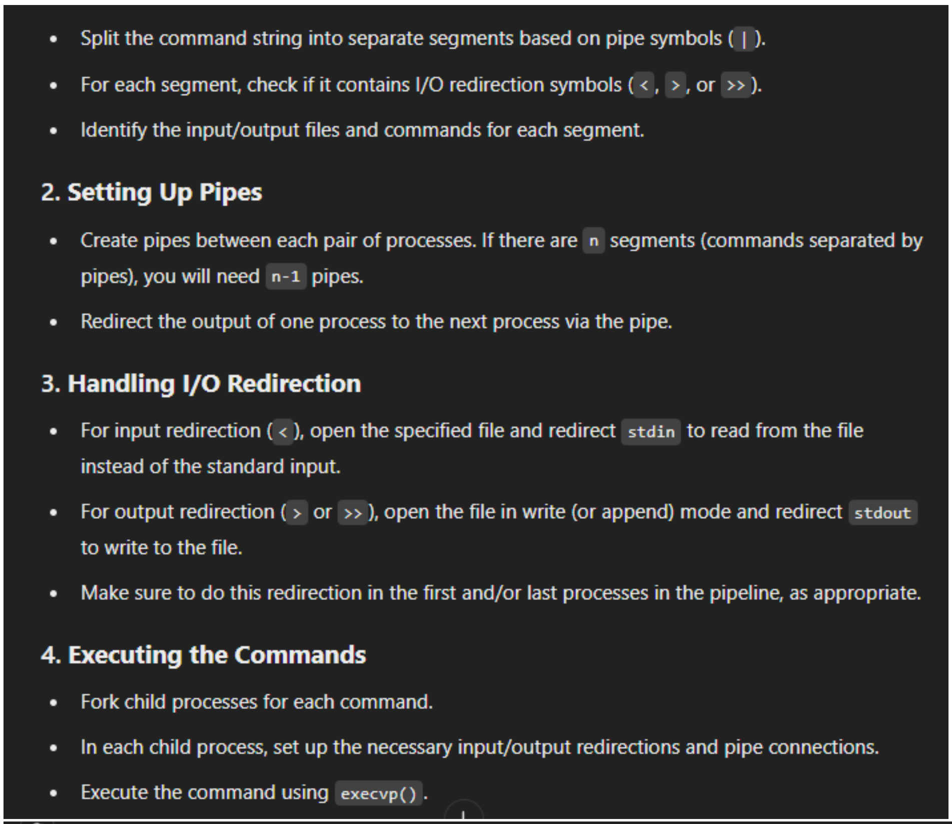
2. Setting Up Pipes

- Create pipes between each pair of processes. If there are `n` segments (commands separated by pipes), you will need `n-1` pipes.
- Redirect the output of one process to the next process via the pipe.

3. Handling I/O Redirection

- For input redirection (`<`), open the specified file and redirect `stdin` to read from the file instead of the standard input.
- For output redirection (`>` or `>>`), open the file in write (or append) mode and redirect `stdout` to write to the file.
- Make sure to do this redirection in the first and/or last processes in the pipeline, as appropriate.

4. Executing the Commands



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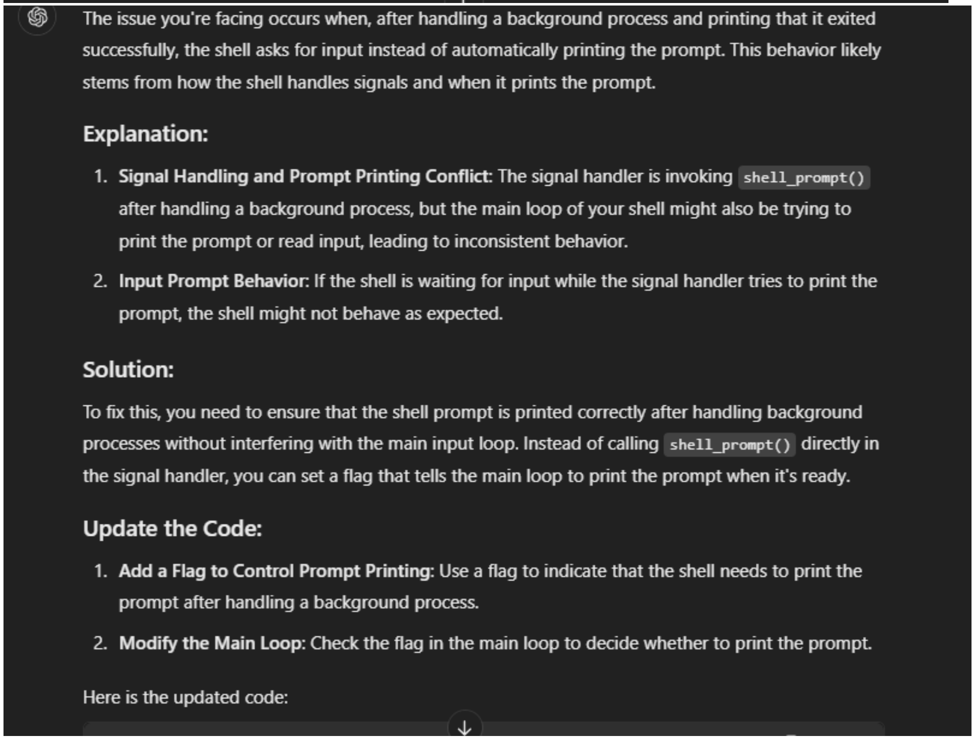
4. Executing the Commands

- Fork child processes for each command.
- In each child process, set up the necessary input/output redirections and pipe connections.
- Execute the command using `execvp()`.



The issue you're facing occurs when, after handling a background process and printing that it exited successfully, the shell asks for input instead of automatically printing the prompt. This behavior likely stems from how the shell handles signals and when it prints the prompt.

Explanation:

1. **Signal Handling and Prompt Printing Conflict:** The signal handler is invoking `shell_prompt()` after handling a background process, but the main loop of your shell might also be trying to print the prompt or read input, leading to inconsistent behavior.
2. **Input Prompt Behavior:** If the shell is waiting for input while the signal handler tries to print the prompt, the shell might not behave as expected.

Solution:

To fix this, you need to ensure that the shell prompt is printed correctly after handling background processes without interfering with the main input loop. Instead of calling `shell_prompt()` directly in the signal handler, you can set a flag that tells the main loop to print the prompt when it's ready.

Update the Code:

1. **Add a Flag to Control Prompt Printing:** Use a flag to indicate that the shell needs to print the prompt after handling a background process.
2. **Modify the Main Loop:** Check the flag in the main loop to decide whether to print the prompt.

Here is the updated code:

} why is the ctrl +z functionality not working

The Ctrl+Z functionality is not working because of a mistake in the `handle_sigstp` function.

In the `handle_sigstp` function, you are sending the `SIGTSTP` signal to the process group with the ID `-foreground_pid`. However, the `foreground_pid` variable stores the PID of the foreground process, not the process group ID.

To fix this, you should use the `tcsetpgrp` function to get the process group ID of the foreground process, and then send the `SIGTSTP` signal to that process group ID.

Here's the corrected `handle_sigstp` function: