Course COMP-8567
Assignment 02
Fall 2023
Due Date: Oct/31/2023
50 Marks

Write a C program that searches for processes in the process tree (rooted at a specified process) and outputs the requested information based on the input parameters.

Synopsis :

prctree [*root_process]* [*process_id1*] [*process_id2*]… [*process_id(n)*] [*OPTION*]

- 1 >=n <= 6
- Lists the PID and PPID of each *process_id(n)* if *process_id(n)* belongs to the process tree rooted at *root_process*
    - *root_process* is the PID of a process that is a descendant of the current bash process.
    - *process_id(n)* is the PID of a process that is a descendant of the current bash process. //up to 6 such processes can be listed

OPTION

-dn additionally lists the PIDs of all the **non-direct** descendants of *process_id1 (only)*

-id additionally lists the PIDs of all the **immediate** descendants of *process_id1*

-lp additionally lists the PIDs of all the **sibling processes** of *process_id1*

- sz additionally Lists the PIDs of all **sibling** processes of *process_id1* that are **defunct**

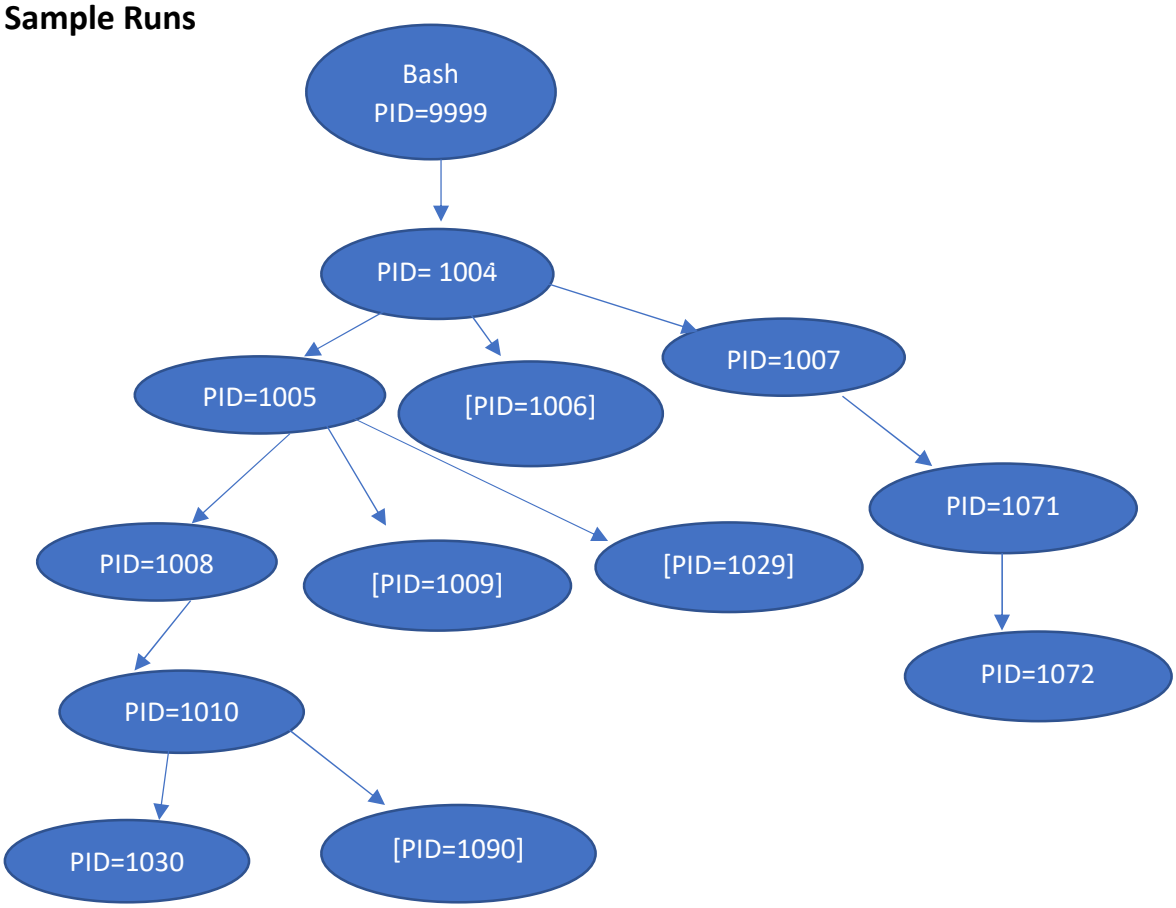
- gp additionally lists the PIDs of all the **grandchildren** of *process_id1*

- zz additionally prints the status of *process_id1* (Defunct/ Not Defunct)

- zc additionally lists the PIDs of all the direct descendants of *process_id1* that are currently in the defunct state

-**zx** additionally lists the PIDs of the direct descendants of *process_id1..process_id[n]* that are currently in the defunct state

Sample Runs



Note: In the above example, [PID=1006], [PID=1009], [PID=1029] and [PID=1090] are defunct (zombie) processes at the time of execution of the following programs

$ prctree 1004 1009
1009 1005
 	
$ prctree 1004 1008 1007
1008 1005
1007 1004
 	
$ prctree 1005 1062 1010 1090
1010 1008
	$ prctree 1004 1005 1071 -zc
	1005 1004
	1071 1007
	1009
	1029
	
	$ prctree 1004 1008 1071 -sz
	1008 1005
	1071 1007

$ prctree 1005 1020
//No output
 	
$ prctree 1005 1010 -zz
1010 1008
NOT DEFUNCT
 	
$ prctree 1004 1005 1007 -dn
1005 1004
1007 1004
1010
1030
1090
 	
$ prctree 1004 1005 1007 -id
1005 1004
1007 1004
1008
1009
1029
	1009
	1029
	
	$ prctree 1004 1030 -lp
	1030 1010
	1090
	
	$ prctree 1005 1008 -gp
	1008 1005
	1030
	1090
	
	$ prctree 1004 1005 -zc
	1005 1004
	1009
	1029
	
	$ prctree 1004 1005 1010 -zx
	1005 1004
	1010 1008
	1009
	1029
	1090

Comments and explanation of the program

-You are required to include adequate and appropriate comments to explain the working of the program.
-Please see the assignment rubrics for more information

Submission:

Submission Instructions:

You are required to submit the following:

1. prctree.c

2. prctree.txt //note: prctree.txt must be an identical copy of prctree.c with a .txt extension

3. Zoom/Google Drive recording link explaining the following (10-15 minutes)

- Overall working of the code and various modules (around 8-9 minutes)
- Execution of the code under various inputs/conditions as per the requirements of the assignment (around 6-7 minutes)
- Other forms of links/MP4 files will NOT be acceptable.
- Include the link in the COMMENTS section.

Please Note:

- You are required to follow the Submission Instructions carefully and email the instructor reasonably ahead of the submission deadline in case of any questions.
- After your submission, you will be able to view the **Turnitin similarity report** that compares your submission with all the remaining submissions in the section/all the sections of the course.

References: (limited listing)

- pstree
- ps
- pgrep (etc.)