Course COMP-8567
Assignment 02
Winter 2024
Due Date: Mar/03/2024
50 Marks

Write a C program <mark>a2prc.c</mark> that searches for processes in the process tree (rooted at a specified process) and prints the requested information based on the input parameters.

Synopsis :

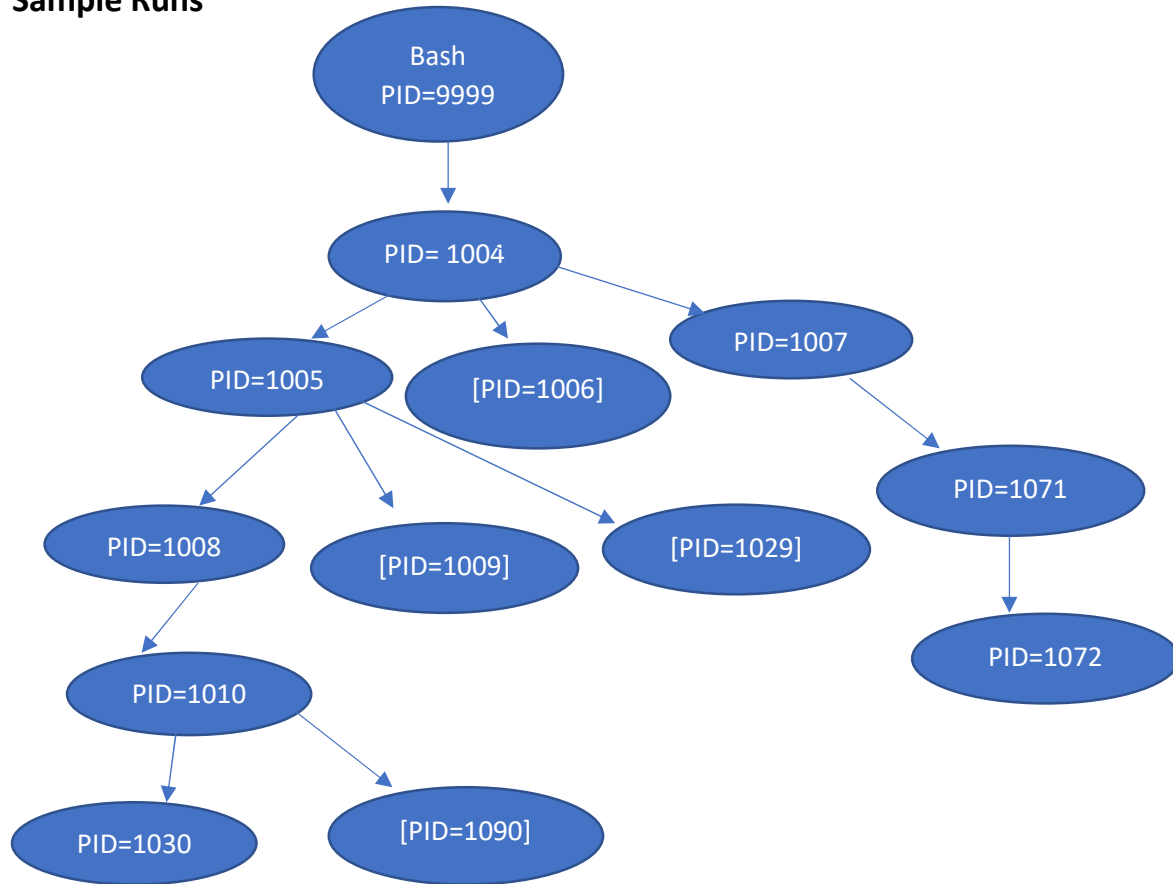**a2prc [*process_id]* [*root_process*] [*OPTION*]**

- Lists the PID and PPID of each *process_id* if *process_id* belongs to the process tree rooted at *root_process* else does not print anything
    - *root_process* is the PID of a process that is a descendant of the current bash process.
    - *process_id* is the PID of a process that is a descendant of the current bash process.

Note: In any of the following options, is process_id does not belong to the process tree rooted at root_process , you need to print <mark>*" Does not belong to the process tree"*</mark>

OPTION

-rp   The *root_process* kills *process_id* with SIGKILL

-pr   *process_id* kills the *root_process*

-xn   lists the PIDs of <u>all</u> the **non-direct** descendants of *process_id*

-xd   lists the PIDs of all the **immediate** descendants of *process_id*

-xs   lists the PIDs of all the **sibling processes** of   *process_id*

-xt   The *root_process* pauses *process_id* with **SIGSTOP**

-xc   The *root_process* sends **SIGCONT** to all processes that have been paused earlier

- xz   Lists the PIDs of all **descendents of *process_id* that are defunct**

- xg   lists the PIDs of all the **grandchildren** of *process_id*

- zs   prints the status of *process_id* (Defunct/ Not Defunct)

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

$ a2prc 1009 1004
1009 1005
 	
$ a2prc 1072 1004
1072 1071
 	
$ a2prc 1005 1007
Does not belong to the process tree
 	
$ a2prc 1020 1005
Does not belong to the process tree
	$ a2prc 1005 1004 -xz
	1009
	1029
	1090
	
	$ a2prc 1009 1005 -xz
	No descendant zombie process/es
	
	$ a2prc 1030 1004 -xs
	1090
	
	$ a2prc 1071 1005 -xs
	Does not belong to the process tree

$ a2prc 1005 1004 -xn
1010
1030
1090
 	
$ a2prc 1010 1008 -xn
No non-direct descendants
 	
$ a2prc 1005 1004 -xd
1008
1009
1029
 	
$ a2prc 1030 1008 -xd
No direct descendants
	$ a2prc 1072 1004 -xs
	No sibling/s
	
	$ a2prc 1010 1008 -zs
	Not defunct
	
	$ a2prc 1090 1008 -zs
	Defunct
	
	$ a2prc 1008 1005 -xg
	1030
	1090
	
	$ a2prc 1010 1008 -xg
	No grandchildren

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 (Note: Plagiarism Detection Tool: MOSS)

You need to submit the following:
1. a2prc_firstname_lastname_SID.c
3. Zoom/Google Drive recording link explaining the following (not more than 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 form of links/MP4 files will NOT be acceptable.
- Include the link in the COMMENTS section.