

CPU Utilization Evaluation:

Using the program “htop” (an updated top command)

- % should be $> (100) * (\# \text{ worker threads})$.

2 Worker Threads (1 producer, 1 consumer):

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
6822	greghab	20	0	146M	248	192	S	138.	0.0	0:02.42	./pcMatrix 1 5 2 0
6824	greghab	20	0	146M	248	192	S	84.8	0.0	0:01.48	./pcMatrix 1 5 2 0
1332	root	20	0	5629M	471M	404M	R	73.8	0.7	2h59:03	/nix/store/9jbc3lrg18pqj2ysfzgm5b9cfsqqs3l1-xorg-server-1.20.
26234	greghab	20	0	238M	19600	10020	R	73.1	0.0	2:03.21	/etc/profiles/per-user/greghab/bin/urxvt
6823	greghab	20	0	146M	248	192	S	54.0	0.0	0:00.93	./pcMatrix 1 5 2 0

- We see 3 “pcMatrix” processes because I have 1 main, and 2x additional worker threads.

$$138 + 84.8 + 54.0 = 276.8\%$$

(meets $> 200\%$ requirement)

4 Worker Threads (2 producers, 2 consumers):

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
6426	greghab	20	0	290M	248	192	S	192.	0.0	0:03.55	./pcMatrix 2 5 2 0
1332	root	20	0	5597M	455M	388M	R	76.7	0.7	2h57:50	/nix/store/9jbc3lrg18pqj2ysfzgm5b9cfsqqs3l1-xorg-server-1.20.
26234	greghab	20	0	238M	19600	10020	R	73.2	0.0	1:45.98	/etc/profiles/per-user/greghab/bin/urxvt
6430	greghab	20	0	290M	248	192	S	57.8	0.0	0:01.06	./pcMatrix 2 5 2 0
6431	greghab	20	0	290M	248	192	R	57.8	0.0	0:01.06	./pcMatrix 2 5 2 0
6428	greghab	20	0	290M	248	192	S	39.0	0.0	0:00.71	./pcMatrix 2 5 2 0
6429	greghab	20	0	290M	248	192	R	39.0	0.0	0:00.70	./pcMatrix 2 5 2 0

- We see 5 “pcMatrix” processes because I have 1 main, and 4x additional worker threads.

$$192 + 57.8 + 57.8 + 39.0 + 39.0 = 385.6\%$$

(almost meets $> 400\%$ requirement)

6 Worker Threads (3 producers, 3 consumers):

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
7190	greghab	20	0	434M	244	192	S	209.	0.0	0:03.47	./pcMatrix 3 5 2 0
26234	greghab	20	0	238M	19600	10020	R	74.4	0.0	2:08.98	/etc/profiles/per-user/greghab/bin/urxvt
1332	root	20	0	5598M	472M	405M	R	73.0	0.7	3h00:06	/nix/store/9jbc3lrg18pqj2ysfzgm5b9cfsqqs3l1-xorg-server-1.20.
7195	greghab	20	0	434M	244	192	S	42.8	0.0	0:00.70	./pcMatrix 3 5 2 0
7196	greghab	20	0	434M	244	192	S	42.1	0.0	0:00.69	./pcMatrix 3 5 2 0
7197	greghab	20	0	434M	244	192	R	41.4	0.0	0:00.68	./pcMatrix 3 5 2 0
7371	greghab	20	0	6639M	406M	163M	S	31.6	0.6	3h00:40	/nix/store/ap9n7zn1hcxw0qlkvvnv6vq8d1ricj6ks-obs-studio-25.0.8
7192	greghab	20	0	434M	244	192	S	28.1	0.0	0:00.45	./pcMatrix 3 5 2 0
7193	greghab	20	0	434M	244	192	R	28.1	0.0	0:00.45	./pcMatrix 3 5 2 0
7194	greghab	20	0	434M	244	192	S	28.1	0.0	0:00.45	./pcMatrix 3 5 2 0

- We see 7 “pcMatrix” processes because I have 1 main, and 6x additional worker threads.

$$209 + 42.8 + 42.1 + 41.4 + 28.1 + 28.1 + 28.1 = 419.6\%$$

(not close to $> 600\%$ requirement)