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The average burst size greatly increases turnaround time and waiting time, but not in a directly linear way. From an average burst of 20 to an average burst of 40, non-preemptive waiting time increased by a factor of 40, while turnaround time increased by a factor of 26. The preemptive waiting time increased by a factor of 47, while the preemptive turnaround time increased by a factor of 29. From the average 40 burst to the average 60 burst results, the wait and turn time increased by roughly 2.5 times for non-preemptive, and about 3 times for the wait and turn time of the preemptive version. From an average burst of 60 to an average burst of 80, both preemptive and non-preemptive increased by just under a factor of two. We can see then that wait and turnaround time increase, but at a decreasing rate as burst size increases.

This is intuitive, since increasing burst time gives a higher probability of processes being starved out due to the CPU not being able to keep up quickly enough with the arrival of processes. This isn't a problem initially with a burst size of 20 since the arrival of new processes was slower than the rate that processes were being completed. As the CPU gets backed up, processes will queue up, and the rate of degradation increases by factors, which our results show. At a certain point, the queue is so hopelessly behind that additional processes to the queue decrease performance more linearly, since one more process is small compared to the relative size of the queue. We can say then, that when a process is being overwhelmed initially, wait time and turnaround time increase exponentially, but at a decreasing rate. At a certain point in time, the rate at which the wait and turnaround time increase will be linear, and then subsequently, sub-linear.

The preemptive version of the process provides a slightly better turnaround time, but for the most part, SJF non-preemptive and SJF preemptive for our data give almost the same results once the processor gets overwhelmed. For lower bursts, SJF preemptive will give lower turnaround time because the more processes on average will be completed sooner.

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Processes - 250, Avg Burst - 20, Avg arrival - 20, Avg Priority - 4

SJF (non-preemptive) Burst 20

	Wait	Response	Turnaround
Min	0	0	1
Mean	32.97	32.97	52.22
Max	734	734	794
StdDev	80.2	80.2	87.5

Processes - 250, Avg Burst - 40, Avg arrival - 20, Avg Priority - 4

SJF (non-preemptive) Burst 40

	Wait	Response	Turnaround
Min	0	0	5
Mean	1308.94	1308.94	1346.33
Max	8598	8598	8680
StdDev	2536.19	2536.19	2560.87

Processes - 250, Avg Burst - 60, Avg arrival - 20, Avg Priority - 4

SJF (non-preemptive) Burst 60

	Wait	Response	Turnaround
Min	0	0	12
Mean	3545.43	3545.43	3602.65
Max	13341	13341	13440
StdDev	3906.347	3906.347	3921.206

Processes - 250, Avg Burst - 80, Avg arrival - 20, Avg Priority - 4

SJF (non-preemptive) Burst 80

	Wait	Response	Turnaround
Min	0	0	32
Mean	5964.77	5964.77	6041.15
Max	18278	18278	18377
StdDev	5436.119	5436.119	5450.071

Processes - 250, Avg Burst - 20, Avg arrival - 20, Avg Priority - 4

SJF (preemptive) Burst 20

	Wait	Response	Turnaround
Min	0	0	1
Mean	27.64	22.94	46.9
Max	734	734	794
StdDev	85.01	80.96	93.66

Processes - 250, Avg Burst - 40, Avg arrival - 20, Avg Priority - 4

SJF (preemptive) Burst 40

	Wait	Response	Turnaround
Min	0	0	1
Mean	1307.62	1304.94	1345
Max	8598	8598	8680
StdDev	2537.72	2538.97	2562.41

Processes - 250, Avg Burst - 60, Avg arrival - 20, Avg Priority - 4

SJF (preemptive) Burst 60

	Wait	Response	Turnaround
Min	0	0	9
Mean	3544.82	3541.5	3602.04
Max	13341	13341	13440
StdDev	3907.119	3909.713	3921.987

Processes - 250, Avg Burst - 80, Avg arrival - 20, Avg Priority - 4

SJF (preemptive) Burst 80

	Wait	Response	Turnaround
Min	0	0	32
Mean	5964.53	5963.42	6040.91
Max	17921	17921	18020
StdDev	5435.424	5436.606	5449.382

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Performance Metric Ratio by Avg Burst (Avg burst = 20 as baseline case)

Avg Burst	NP Avg Wait Ratio	NP Avg Resp Ratio	NP Avg Turn Ratio	P Avg Wait Ratio	P Avg Resp Ratio	P Avg Turn Ratio
20	1	1	1	1	1	1
40	40	40	26	47	57	29
60	108	108	69	128	154	77
80	181	181	116	216	260	129

Wait

	SFJ (non-pre) B20	SFJ (non-pre) B40	SFJ (non-pre) B60	SFJ (non-pre) B80	SFJ (pre) B20	SFJ (pre) B40	SFJ (pre) B60	SFJ (pre) B80
Mean	32.97	1308.94	3545.43	5964.77	27.64	1307.62	3544.82	5964.53
Max	734	8598	13341	18278	734	8598	13341	17921
StdDev	80.2	2536.19	3906.347	5436.119	85.01	2537.72	3907.119	5435.424

Response

	SFJ (non-pre) B20	SFJ (non-pre) B40	SFJ (non-pre) B60	SFJ (non-pre) B80	SFJ (pre) B20	SFJ (pre) B40	SFJ (pre) B60	SFJ (pre) B80
Mean	32.97	1308.94	3545.43	5964.77	22.94	1304.94	3541.5	5963.42
Max	734	8598	13341	18278	734	8598	13341	17921
StdDev	80.2	2536.19	3906.347	5436.119	80.96	2538.97	3909.713	5436.606

Turn Around

	SFJ (non-pre) B20	SFJ (non-pre) B40	SFJ (non-pre) B60	SFJ (non-pre) B80	SFJ (pre) B20	SFJ (pre) B40	SFJ (pre) B60	SFJ (pre) B80
Mean	52.22	1346.33	3602.65	6041.15	46.9	1345	3602.04	6040.91
Max	794	8680	13440	18377	794	8680	13440	18020
StdDev	87.5	2560.87	3921.206	5450.071	93.66	2562.41	3921.987	5449.382

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Summary of Process Turn around Time

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Summary of Process Wait Time

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Summary of Process Response Time

■ Mean ■ Max ■ StdDev