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PROJECT-2 FOR COMP304

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SPACECRAFT SIMULATION

HOW DOES THE SIMULATION WORK?

First, we had locked all the mutexes before creating control tower thread in order to prevent perform any action without the acknowledgement of the control tower.

Then, we create control tower thread and the first job thread which is a launch job. This first job unlocks the mutex for the control tower. There is no need a lock for the first job since it always starts at the beginning of the simulation.

In a while loop, all the jobs start to be created as a thread according to their probability except the emergency job. It depends on the timer. After a job has been created, we add them to their queues. Also their IDs, types and request times are added to the logArray in order to output event.log later.

Since we had locked all the mutex at the beginning, if a job want to use pad A or pad B, it waits a signal from the control tower that unlocks the job mutex and the pad mutex. Control tower unlocks the job and pad mutexes according to booleans of the pads. Therefore, no action happens without the acknowledgement of the control tower and no confusion happens among the pads and jobs.

In the job threads, we handled the end times, turnaround times and pad names. We add those data to logArray by tracking the IDs of the jobs. After simulation ends, we write the log array into the event.log according to their IDs.

In debugQue() function, we handled the “-n” argument. In order to do this, we defined “for_each_item" macro. It helps us to find the IDs of the jobs in the queues.

SCREEN SHOTS

EventID	Status	Request Time	End Time	Turnaround Time	Pad
0	D	0	4	4	A
1	L	2	4	2	B
2	L	4	6	2	A
3	L	6	8	2	B
4	L	8	10	2	A
5	L	12	14	2	A
6	L	14	16	2	B
7	L	16	18	2	A
8	L	18	20	2	B
9	D	18	28	10	A
10	A	18	40	22	B
11	L	20	22	2	A
12	L	22	24	2	B
13	D	22	33	11	A
14	A	22	53	31	B
15	L	24	27	3	B
16	D	24	41	17	A
17	A	24	65	41	B
18	L	32	36	4	A
19	D	32	60	28	A
20	A	32	77	45	B
21	L	34	44	10	A
22	L	36	47	11	A
23	D	36	74	38	A
24	A	36	91	55	B
25	L	40	50	10	A
26	L	42	52	10	A
27	L	48	55	7	A
28	L	50	63	13	A
29	L	52	66	14	A
30	L	54	69	15	A
31	D	54	79	25	A
32	A	54	104	50	B
33	L	58	81	23	A
34	L	60	87	27	A
35	L	62	90	28	A
36	L	66	93	27	A
37	L	68	95	27	A
38	D	68	100	32	A
39	A	68	120	52	B
40	L	70	102	32	A
41	D	70	117	47	A
42	A	70			
43	L	74	105	31	A
44	L	76	107	31	B
45	L	78	109	31	A
46	L	80	112	32	A
47	E	82	85	3	A
48	E	82	85	3	B
49	L	84	120	36	A
50	L	86			

SPACECRAFT SIMULATION

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Simulation has been started and a rocket taking off from pad A.

At 50 sec launch :       19, 23
At 50 sec landing :      26, 27, 28
At 50 sec assembly :     14, 17, 20, 24

At 51 sec launch :       19, 23
At 51 sec landing :      27, 28, 29
At 51 sec assembly :     14, 17, 20, 24

At 52 sec launch :       19, 23
At 52 sec landing :      27, 28, 29
At 52 sec assembly :     17, 20, 24

At 53 sec launch :       19, 23
At 53 sec landing :      27, 28, 29, 30
At 53 sec assembly :     17, 20, 24

At 54 sec launch :       19, 23, 31
At 54 sec landing :      28, 29, 30
At 54 sec assembly :     17, 20, 24, 32

At 55 sec launch :       19, 23, 31
At 55 sec landing :      28, 29, 30
At 55 sec assembly :     17, 20, 24, 32

At 56 sec launch :       19, 23, 31
At 56 sec landing :      28, 29, 30
At 56 sec assembly :     17, 20, 24, 32

At 57 sec launch :       19, 23, 31
At 57 sec landing :      28, 29, 30, 33
At 57 sec assembly :     17, 20, 24, 32

At 58 sec launch :       19, 23, 31
At 58 sec landing :      28, 29, 30, 33
At 58 sec assembly :     17, 20, 24, 32

At 59 sec launch :       23, 31
At 59 sec landing :      28, 29, 30, 33, 34
At 59 sec assembly :     17, 20, 24, 32

At 60 sec launch :       23, 31
At 60 sec landing :      28, 29, 30, 33, 34
At 60 sec assembly :     17, 20, 24, 32

At 61 sec launch :       23, 31
At 61 sec landing :      28, 29, 30, 33, 34, 35
At 61 sec assembly :     17, 20, 24, 32

At 62 sec launch :       23, 31
At 62 sec landing :      29, 30, 33, 34, 35
At 62 sec assembly :     17, 20, 24, 32

At 63 sec launch :       23, 31
At 63 sec landing :      29, 30, 33, 34, 35
At 63 sec assembly :     17, 20, 24, 32

At 64 sec launch :       23, 31
At 64 sec landing :      29, 30, 33, 34, 35
At 64 sec assembly :     20, 24, 32
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At 65 sec launch :       23, 31
At 65 sec landing :      30, 33, 34, 35, 36
At 65 sec assembly :     20, 24, 32

At 66 sec launch :       23, 31
At 66 sec landing :      30, 33, 34, 35, 36
At 66 sec assembly :     20, 24, 32

At 67 sec launch :       23, 31, 38
At 67 sec landing :      30, 33, 34, 35, 36, 37
At 67 sec assembly :     20, 24, 32, 39

At 68 sec launch :       23, 31, 38
At 68 sec landing :      33, 34, 35, 36, 37
At 68 sec assembly :     20, 24, 32, 39

At 69 sec launch :       23, 31, 38, 41
At 69 sec landing :      33, 34, 35, 36, 37, 40
At 69 sec assembly :     20, 24, 32, 39, 42

At 70 sec launch :       23, 31, 38, 41
At 70 sec landing :      33, 34, 35, 36, 37, 40
At 70 sec assembly :     20, 24, 32, 39, 42

At 71 sec launch :       23, 31, 38, 41
At 71 sec landing :      33, 34, 35, 36, 37, 40
At 71 sec assembly :     20, 24, 32, 39, 42

At 72 sec launch :       23, 31, 38, 41
At 72 sec landing :      33, 34, 35, 36, 37, 40
At 72 sec assembly :     20, 24, 32, 39, 42

At 73 sec launch :       31, 38, 41
At 73 sec landing :      33, 34, 35, 36, 37, 40, 43
At 73 sec assembly :     20, 24, 32, 39, 42

At 74 sec launch :       31, 38, 41
At 74 sec landing :      33, 34, 35, 36, 37, 40, 43
At 74 sec assembly :     20, 24, 32, 39, 42

At 75 sec launch :       31, 38, 41
At 75 sec landing :      33, 34, 35, 36, 37, 40, 43, 44
At 75 sec assembly :     20, 24, 32, 39, 42

At 76 sec launch :       31, 38, 41
At 76 sec landing :      33, 34, 35, 36, 37, 40, 43, 44
At 76 sec assembly :     24, 32, 39, 42

At 77 sec launch :       31, 38, 41
At 77 sec landing :      33, 34, 35, 36, 37, 40, 43, 44, 45
At 77 sec assembly :     24, 32, 39, 42

At 78 sec launch :       38, 41
At 78 sec landing :      33, 34, 35, 36, 37, 40, 43, 44, 45
At 78 sec assembly :     24, 32, 39, 42

At 79 sec launch :       38, 41
At 79 sec landing :      33, 34, 35, 36, 37, 40, 43, 44, 45, 46
At 79 sec assembly :     24, 32, 39, 42
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At 80 sec launch :      38, 41
At 80 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46
At 80 sec assembly :    24, 32, 39, 42

At 81 sec launch :      38, 41
At 81 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46
At 81 sec assembly :    24, 32, 39, 42

At 82 sec launch :      38, 41
At 82 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46
At 82 sec assembly :    24, 32, 39, 42

At 83 sec launch :      38, 41
At 83 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46, 49
At 83 sec assembly :    24, 32, 39, 42

At 84 sec launch :      38, 41
At 84 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46, 49
At 84 sec assembly :    24, 32, 39, 42

At 85 sec launch :      38, 41
At 85 sec landing :     34, 35, 36, 37, 40, 43, 44, 45, 46, 49, 50
At 85 sec assembly :    24, 32, 39, 42

At 86 sec launch :      38, 41
At 86 sec landing :     35, 36, 37, 40, 43, 44, 45, 46, 49, 50
At 86 sec assembly :    24, 32, 39, 42

At 87 sec launch :      38, 41
At 87 sec landing :     35, 36, 37, 40, 43, 44, 45, 46, 49, 50
At 87 sec assembly :    24, 32, 39, 42

At 88 sec launch :      38, 41
At 88 sec landing :     35, 36, 37, 40, 43, 44, 45, 46, 49, 50
At 88 sec assembly :    24, 32, 39, 42

At 89 sec launch :      38, 41
At 89 sec landing :     36, 37, 40, 43, 44, 45, 46, 49, 50, 51
At 89 sec assembly :    24, 32, 39, 42

At 90 sec launch :      38, 41
At 90 sec landing :     36, 37, 40, 43, 44, 45, 46, 49, 50, 51
At 90 sec assembly :    32, 39, 42

At 91 sec launch :      38, 41
At 91 sec landing :     36, 37, 40, 43, 44, 45, 46, 49, 50, 51, 52
At 91 sec assembly :    32, 39, 42

At 92 sec launch :      38, 41
At 92 sec landing :     37, 40, 43, 44, 45, 46, 49, 50, 51, 52
At 92 sec assembly :    32, 39, 42

At 93 sec launch :      38, 41, 54
At 93 sec landing :     37, 40, 43, 44, 45, 46, 49, 50, 51, 52, 53
At 93 sec assembly :    32, 39, 42, 55

At 94 sec launch :      38, 41, 54
At 94 sec landing :     40, 43, 44, 45, 46, 49, 50, 51, 52, 53
At 109 sec landing :    46, 49, 50, 51, 52, 53, 56, 57, 58, 59
At 109 sec assembly :   39, 42, 55

At 110 sec launch :     41, 54
At 110 sec landing :    46, 49, 50, 51, 52, 53, 56, 57, 58, 59, 60
At 110 sec assembly :   39, 42, 55

At 111 sec launch :     41, 54, 62
At 111 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61
At 111 sec assembly :   39, 42, 55, 63

At 112 sec launch :     41, 54, 62
At 112 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61
At 112 sec assembly :   39, 42, 55, 63

At 113 sec launch :     41, 54, 62
At 113 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64
At 113 sec assembly :   39, 42, 55, 63

At 114 sec launch :     41, 54, 62
At 114 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64
At 114 sec assembly :   39, 42, 55, 63

At 115 sec launch :     41, 54, 62
At 115 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64, 65
At 115 sec assembly :   39, 42, 55, 63

At 116 sec launch :     41, 54, 62
At 116 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64, 65
At 116 sec assembly :   39, 42, 55, 63

At 117 sec launch :     54, 62
At 117 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64, 65
At 117 sec assembly :   39, 42, 55, 63

At 118 sec launch :     54, 62
At 118 sec landing :    49, 50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64, 65
At 118 sec assembly :   39, 42, 55, 63

At 119 sec launch :     54, 62
At 119 sec landing :    50, 51, 52, 53, 56, 57, 58, 59, 60, 61, 64, 65, 66
At 119 sec assembly :   42, 55, 63
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IMPORTANT NOTE:

1) **We worked on a windows machine. So our event.log is created in a windows machine. When we try to create event.log in macOS or linux, format of the event.log changes. For example tabs and spaces go weird. We are aware of that situation. We could handle this situation by writing "#ifdef __APPLE__" etc. But we think that it is beyond purpose of our project.**

2) **Please, read README.txt to how to run the program.**