



UNIVERSIDADE
DE ÉVORA

Simulador Sistema Operativo

Trabalho realizado por:

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1. Objetivo:

Pretende-se implementar um simulador de Sistema Operativo tendo em conta o modelo de 5 estados (READY,BLOCKED,RUNNING,NEW e EXIT).

2. Desenvolvimento:

Primeiramente foram inicializadas as filas de espera do tipo FIFO(“Queue”) , após saber quantos processos vão ser analisados neste programa , para cada um será colocado ou em fila de espera(Ready) quando o instante de tempo para serem inicializados é 0 ou em fila de espera(New) . Caso seja colocado na fila de espera(Ready) e essa mesma fila estiver vazia passa diretamente para o estado “RUNNING” , caso esteja na fila de espera(New) vai decrementado a cada instante até que o processo seja inicializado.

Foram criadas 4 funções para auxiliar o programa: *void output(int linha,char assign[])* que para cada instante irá imprimir o estado do processo , *bool verificaColuna(int programa[][],int coluna)* retorna TRUE se a coluna se encontrar totalmente vazia ou FALSE caso contrário , *bool terminouProcesso(int programas[][],int coluna,int linha)* que retorna TRUE se o processo já estiver terminado e FALSE caso contrário , *bool findInt(int num,struct Queue* quele)* retorna TRUE caso num esteja em uma determinada fila de espera.

Posteriormente para cada instante de cada processo existem 8 condições que verificam o seu estado: O processo estar em front(ready) ou em front(ready-aux) no caso VRR e está no estado “RUNNING” , ainda não estar inicializado logo decrementando de NEW , encontrar-se em fila de espera ready no estado “READY” ,

para o caso VRR encontrar-se em fila de espera ready-aux no estado "AUX", o processo encontra-se em front(blocked), ou seja, no estado "BLOCKED" e a decrementar, situa-se em fila de espera blocked mas não decrementando, situa-se em exit portanto chegará ao fim do processo e por ultima condição quando o processo encontra-se terminado imprime "---", realizando este ciclo até que todos os processos estejam terminados. Na primeira condição descrita existem vários fatores a ter em conta tais como, se houver um processo que irá terminar a sua permanência em blocked alternando o seu estado para "READY" nesse caso temos que esperar até que esse processo seja colocado em fila de espera(ready) primeiro que o processo que está no estado "RUNNING" e passará para o estado "READY" devido ao quantum.

3. Input de teste:

```
int programas[5][10] = {  
    {0, 3, 1, 2, 2, 4, 1, 1, 1, 1},  
    {1, 2, 4, 2, 4, 2, 0, 0, 0, 0},  
    {3, 1, 6, 1, 6, 1, 6, 1, 0, 0},  
    {3, 6, 1, 6, 1, 6, 1, 6, 0, 0},  
    {5, 9, 1, 9, 0, 0, 0, 0, 0, 0}  
};
```

Output:

I. Caso RR

"C:\Users\rafae\Desktop\Trabalho Sistemas\cmake-build-debug\Trabalho_Sistemas.exe"

instante	proc1	proc2	proc3	proc4	proc5
1	NEW	---	---	---	---
2	RUN	NEW	---	---	---
3	RUN	RDY	---	---	---
4	RUN	RDY	NEW	NEW	---
5	BLO	RUN	RDY	RDY	---
6	RDY	RUN	RDY	RDY	NEW
7	RDY	BLO	RUN	RDY	RDY
8	RDY	BLO	BLO	RUN	RDY
9	RDY	BLO	BLO	RUN	RDY
10	RDY	BLO	BLO	RUN	RDY
11	RUN	RDY	BLO	RDY	RDY
12	RUN	RDY	BLO	RDY	RDY
13	BLO	RDY	BLO	RDY	RUN
14	BLO	RDY	BLO	RDY	RUN
15	BLO	RDY	BLO	RDY	RUN
16	BLO	RUN	BLO	RDY	RDY
17	BLO	RUN	RDY	RDY	RDY
18	BLO	BLO	RDY	RUN	RDY
19	RDY	BLO	RDY	RUN	RDY
20	RDY	BLO	RDY	RUN	RDY
21	RDY	BLO	RDY	BLO	RUN
22	RDY	BLO	RDY	BLO	RUN
23	RDY	RDY	RDY	BLO	RUN
24	RDY	RDY	RUN	RDY	RDY
25	RUN	RDY	BLO	RDY	RDY
26	RUN	RDY	BLO	RDY	RDY
27	RUN	RDY	BLO	RDY	RDY
28	RDY	RUN	BLO	RDY	RDY
29	RDY	RUN	BLO	RDY	RDY
30	RDY	EXT	BLO	RUN	RDY
31	RDY	---	RDY	RUN	RDY
32	RDY	---	RDY	RUN	RDY
33	RDY	---	RDY	RDY	RUN
34	RDY	---	RDY	RDY	RUN
35	RDY	---	RDY	RDY	RUN
36	RUN	---	RDY	RDY	BLO
37	BLO	---	RUN	RDY	RDY
38	RDY	---	BLO	RUN	RDY
39	RDY	---	BLO	RUN	RDY
40	RDY	---	BLO	RUN	RDY
41	RDY	---	BLO	BLO	RUN
42	RDY	---	BLO	BLO	RUN
43	RDY	---	BLO	BLO	RUN

44	RUN	---	RDY	BLO	RDY
45	BLO	---	RUN	RDY	RDY
46	RDY	---	EXT	RDY	RUN
47	RDY	---	---	RDY	RUN
48	RDY	---	---	RDY	RUN
49	RDY	---	---	RUN	RDY
50	RDY	---	---	RUN	RDY
51	RDY	---	---	RUN	RDY
52	RUN	---	---	RDY	RDY
53	EXT	---	---	RDY	RUN
54	---	---	---	RDY	RUN
55	---	---	---	RDY	RUN
56	---	---	---	RUN	EXT
57	---	---	---	RUN	---
58	---	---	---	RUN	---
59	---	---	---	BLO	---
60	---	---	---	RUN	---
61	---	---	---	RUN	---
62	---	---	---	RUN	---
63	---	---	---	RUN	---
64	---	---	---	RUN	---
65	---	---	---	RUN	---
66	---	---	---	EXT	---
67	---	---	---	---	---

II. Caso VRR

```
"C:\Users\rafae\Desktop\Trabalho_Sistemas\cmake-build-debug\Trabalho_Sistemas.exe"
instante | proc1 | proc2 | proc3 | proc4 | proc5 |
1        | NEW   | ---   | ---   | ---   | ---   |
2        | RUN   | NEW   | ---   | ---   | ---   |
3        | RUN   | RDY   | ---   | ---   | ---   |
4        | RUN   | RDY   | NEW   | NEW   | ---   |
5        | BLO   | RUN   | RDY   | RDY   | ---   |
6        | AUX   | RUN   | RDY   | RDY   | NEW   |
7        | RUN   | BLO   | RDY   | RDY   | RDY   |
8        | RUN   | BLO   | RDY   | RDY   | RDY   |
9        | BLO   | BLO   | RUN   | RDY   | RDY   |
10       | BLO   | BLO   | BLO   | RUN   | RDY   |
11       | BLO   | AUX   | BLO   | RUN   | RDY   |
12       | BLO   | AUX   | BLO   | RUN   | RDY   |
13       | AUX   | RUN   | BLO   | RDY   | RDY   |
14       | AUX   | RUN   | BLO   | RDY   | RDY   |
15       | RUN   | BLO   | BLO   | RDY   | RDY   |
16       | RUN   | BLO   | BLO   | RDY   | RDY   |
17       | RUN   | BLO   | BLO   | RDY   | RDY   |
18       | RDY   | BLO   | BLO   | RDY   | RUN   |
19       | RDY   | BLO   | AUX   | RDY   | RUN   |
20       | RDY   | BLO   | AUX   | RDY   | RUN   |
21       | RDY   | BLO   | RUN   | RDY   | RDY   |
22       | RDY   | BLO   | BLO   | RUN   | RDY   |
23       | RDY   | AUX   | BLO   | RUN   | RDY   |
24       | RDY   | AUX   | BLO   | RUN   | RDY   |
25       | RDY   | RUN   | BLO   | BLO   | RDY   |
26       | RDY   | RUN   | BLO   | BLO   | RDY   |
27       | RUN   | EXT   | BLO   | BLO   | RDY   |
28       | BLO   | ---   | BLO   | BLO   | RUN   |
29       | BLO   | ---   | AUX   | BLO   | RUN   |
30       | BLO   | ---   | AUX   | AUX   | RUN   |
31       | AUX   | ---   | RUN   | AUX   | RDY   |
32       | AUX   | ---   | BLO   | RUN   | RDY   |
33       | AUX   | ---   | BLO   | RUN   | RDY   |
34       | AUX   | ---   | BLO   | RUN   | RDY   |
35       | RUN   | ---   | BLO   | RDY   | RDY   |
36       | BLO   | ---   | BLO   | RDY   | RUN   |
37       | BLO   | ---   | BLO   | RDY   | RUN   |
38       | BLO   | ---   | AUX   | RDY   | RUN   |
39       | AUX   | ---   | RUN   | RDY   | BLO   |
40       | RUN   | ---   | EXT   | RDY   | AUX   |
41       | EXT   | ---   | ---   | RDY   | RUN   |
42       | ---   | ---   | ---   | RDY   | RUN   |
43       | ---   | ---   | ---   | RDY   | RUN   |
```

44	---	---	---	RUN	RDY
45	---	---	---	RUN	RDY
46	---	---	---	RUN	RDY
47	---	---	---	BLO	RUN
48	---	---	---	AUX	RUN
49	---	---	---	AUX	RUN
50	---	---	---	RUN	RDY
51	---	---	---	RUN	RDY
52	---	---	---	RUN	RDY
53	---	---	---	RDY	RUN
54	---	---	---	RDY	RUN
55	---	---	---	RDY	RUN
56	---	---	---	RUN	EXT
57	---	---	---	RUN	---
58	---	---	---	RUN	---
59	---	---	---	BLO	---
60	---	---	---	RUN	---
61	---	---	---	RUN	---
62	---	---	---	RUN	---
63	---	---	---	RUN	---
64	---	---	---	RUN	---
65	---	---	---	RUN	---
66	---	---	---	EXT	---
67	---	---	---	---	---