

# Simulator pentru alocarea memoriei – documentație

Simulatorul a fost realizat utilizand JavaFX in principal datorită interfeței grafice care oferă o înțelegere mai amplă și o supraveghere mai simplă a proceselor.

Aplicația conține un controller și două clase de obiecte (unul principal, iar altul folosit în afișarea proceselor active în tabel).

Procesele sunt create la inițializarea programului, numărul acestora putând fi modificat din panoul de control, împreună cu „memoria totală” a sistemului și variabilele ce definesc valorile minime și maxime pentru memoria, durata și momentul de pornire al fiecărui proces (care primesc valori random, în funcție de aceste minime și maxime). Numele proceselor sunt generate de o metodă ce dă un string random de 4 litere.

Întreaga aplicație este pusă în mișcare de un timer, care în fiecare secundă apelează metoda „checkTime()”, responsabilă cu crearea și oprirea proceselor. Tot în cadrul acestei metode sunt apelate metodele pentru concatenarea segmentelor de memorie vecine ramase inactive („concatenateMemory()”), shiftarea elementelor array-ului ce conține variabilele „index” ale proceselor ce au statusul 1(activ) sau 2(terminat, așteptand concatenare sau reocuparii segmentului de memorie folosit)(„initializedShifting”), crearea unui nou proces („createProcess()”), sau afisarea mesajelor de eroare („processError()”). În fiecare secundă după inițializarea programului și crearea proceselor, în metoda checkTime, prin intermediul timer-ului fiecare proces este verificat pentru eventualitatea îndeplinirii condiției de pornire (startTime == x, având însă 4 condiții diferite în care poate porni), respectiv oprire (endTime == x).

Având ca setări valorile ce pot fi văzute în control panel, rezultatele în urma rulării pot fi observate în consola IDE-ului.

The image displays two screenshots of a Java IDE (IntelliJ IDEA) running a program titled "Memory allocation simulator". The program is located in the "src > sample > Controller" directory, with the main class being "maxMemory".

**First Screenshot (Top):**

- Code Editor:** Shows the "maxMemory" class with the following configuration in the "CONTROL PANEL":

```
int numberOfProcesses = 10;
int maxMemory = 4000;
int memoryMin = 341, memoryMax = 2048;
int durationMin = 2, durationMax = 6;
int startTimeMin = 2, startTimeMax = 10;
```
- Process Viewer:** A table showing the state of 5 processes:

Index	Name	Memory	Duration	Active
2	asvi	1992	6	2
0	shfn	430	6	3
4	dnsx	775	5	3
1	rtum	637	2	2
5	dtvd	1424	2	3
- Console:** Displays the following output:

```
Used memory: 0
Unused memory: 4000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Create: 0 1 1 3 | 5
Esuat: 4 1 | 5
Incheiate:5
Concatenari: 3
Used memory: 0
Unused memory: 4000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
```

**Second Screenshot (Bottom):**

- Code Editor:** Shows the same "maxMemory" class, but with the "CONTROL PANEL" configuration updated to:

```
int numberOfProcesses = 10;
int maxMemory = 8000;
int memoryMin = 341, memoryMax = 2048;
int durationMin = 2, durationMax = 6;
int startTimeMin = 2, startTimeMax = 10;
```
- Process Viewer:** A table showing the state of 8 processes:

Index	Name	Memory	Duration	Active
1	chpa	934	5	2
5	heib	1499	6	3
8	jafk	1736	2	3
0	wffb	1722	2	3
3	wgsa	1449	5	3
6	fxfc	839	5	3
7	vzff	1888	5	2
4	rqhb	1767	4	3
- Console:** Displays the following output:

```
Unused memory: 8000
Procese initialize: [1, 4, 7, 0, 0, 0, 0, 0, 0, 0]
Create: 0 3 1 4 | 8
Esuat: 1 1 | 2
Incheiate:8
Concatenari: 6
Used memory: 0
Unused memory: 8000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Create: 0 3 1 4 | 8
Esuat: 1 1 | 2
```



```

Main x
Unused memory: 8000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
=====
Create: 0 19 1 5 | 25
Esuat: 39 36 | 75
Incheiate:25
Concatenari: 23
Used memory: 0
Unused memory: 8000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

```

Index	Name	Memory	Duration	Active
8	exbl	520	9	2
19	pzij	725	6	3
33	xebd	1926	5	3
44	dtbv	1636	9	3
52	gdrr	940	8	3
73	itei	1869	5	3
63	ykno	1543	7	3
16	lbqh	753	6	3
82	rkrz	557	9	3
47	rabj	1197	7	3
76	hirw	463	5	3
64	nupe	745	6	2

```
2. Process created successfully ( exbl) memory used: 520, start time: 2). Condition: 2
2. Process created successfully ( pzi) memory used: 725, start time: 2). Condition: 3
2. Process created successfully ( xebd) memory used: 1926, start time: 2). Condition: 3
2. Process created successfully ( dtbv) memory used: 1636, start time: 2). Condition: 3
2. Process created successfully ( gddr) memory used: 940, start time: 2). Condition: 3
2. Process created successfully ( itei) memory used: 1869, start time: 2). Condition: 3
3. Process (hvxr) cannot be created, max memory reached (process: 434, actual: 7616, ma
8000).
3. Process (kzyw) cannot be created, max memory reached (process: 799, actual: 7616, ma
8000).
3. Process (afbx) cannot be created, max memory reached (process: 641, actual: 7616, ma
8000).
```

```

Main ×
Unused memory: -16528
Procese initialize: [76, 97, 54, 43, 68, 2, 0, 0]
=====
Create: 0 24 1 5 | 30
Esuat: 26 44 | 70
Incheiate: 28
Concatenari: 25
Used memory: 1361
Unused memory: -16528
Procese initialize: [76, 54, 43, 68, 2, 0, 0, 0]

```

Index	Name	Memory	Duration	Active
76	qhac	1605	8	2
83	dgna	1733	5	3
3	nrbw	829	5	3
21	ktih	746	6	3
43	ebst	1609	10	2
55	fwga	1258	3	3
25	hldc	518	7	3
86	wqzy	735	7	3
94	hqpl	602	5	3
97	apca	636	10	3
75	gagt	590	8	3
78	umrd	554	3	3

```
2. Process created successfully ( qhac) memory used: 1605, start time: 2). Condition: 2
2. Process created successfully ( dгна) memory used: 1733, start time: 2). Condition: 3
3. Process created successfully ( nrbw) memory used: 829, start time: 3). Condition: 3
3. Process created successfully ( ktih) memory used: 746, start time: 3). Condition: 3
3. Process created successfully ( ebst) memory used: 1609, start time: 3). Condition: 3
3. Process created successfully ( fwga) memory used: 1258, start time: 3). Condition: 3
3. Process (gnsp) cannot be created, max memory reached (process: 1927, actual: 7780,
max: 8000).
3. Process (xojw) cannot be created, max memory reached (process: 1984, actual: 7780, m
8000).
4. Process (gucm) cannot be created, max memory reached (process: 1937, actual: 7780,
max: 8000).
```



```
Main x
Unused memory: 16000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
=====
Create: 0 40 1 11 | 52
Esvat: 15 33 | 48
Incheiate:52
Concatenari: 50
Used memory: 0
Unused memory: 16000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
```

Index	Name	Memory	Duration	Active
10	wvpb	1642	8	2
18	syyl	1577	8	3
38	qqme	1285	10	3
58	lumb	1635	9	3
77	npvg	1772	6	3
88	uodk	1437	6	3
85	xhyc	715	10	3
6	sxjn	646	6	3
14	yrod	752	3	3
35	qsvj	931	8	3
53	wagk	1351	7	3
74	rrvc	1992	2	2

```

2. Process created successfully (wpwb) memory used: 1642, start time: 2). Condition: 3
2. Process created successfully (syyl) memory used: 1577, start time: 2). Condition: 3
2. Process created successfully (qgme) memory used: 1285, start time: 2). Condition: 3
2. Process created successfully (lumb) memory used: 1635, start time: 2). Condition: 3
2. Process created successfully (npgg) memory used: 1772, start time: 2). Condition: 3
2. Process created successfully (uodk) memory used: 1437, start time: 2). Condition: 3
3. Process created successfully (hyxc) memory used: 715, start time: 3). Condition: 3
4. Process created successfully (sxjn) memory used: 646, start time: 4). Condition: 3
4. Process created successfully (yrod) memory used: 752, start time: 4). Condition: 3
4. Process created successfully (qsvj) memory used: 931, start time: 4). Condition: 3
4. Process created successfully (wagk) memory used: 1351, start time: 4). Condition: 3
4. Process created successfully (rxrs) memory used: 1992, start time: 4). Condition: 3

```

```

Main x
Unused memory: 16000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
=====
Create: 0 58 1 14 | 73
Esvat: 54 173 | 227
Incheiate:73
Concatenari: 71
Used memory: 0
Unused memory: 16000
Procese initialize: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

```

Index	Name	Memory	Duration	Active
0	oeir	1208	5	3
9	axhe	447	6	3
13	gwwv	1434	5	3
60	cbuw	873	7	3
117	bkrq	1913	10	3
142	jpfe	1019	5	3
150	dfyu	627	5	3
171	ptia	504	4	3
235	mefj	1630	3	3
251	omln	560	10	3
3	wbpv	1145	9	3
80	zlnr	748	4	3

```
2. Process created successfully (oeir) memory used: 1208, start time: 2). Condition: 2
2. Process created successfully (axhe) memory used: 447, start time: 2). Condition: 3
2. Process created successfully (gvwt) memory used: 1434, start time: 2). Condition: 3
2. Process created successfully (cbwq) memory used: 873, start time: 2). Condition: 3
2. Process created successfully (bkqr) memory used: 1913, start time: 2). Condition: 3
2. Process created successfully (jpfq) memory used: 1019, start time: 2). Condition: 3
2. Process created successfully (dfyu) memory used: 627, start time: 2). Condition: 3
2. Process created successfully (ptja) memory used: 504, start time: 2). Condition: 3
2. Process created successfully (mefj) memory used: 1630, start time: 2). Condition: 3
2. Process created successfully (omln) memory used: 560, start time: 2). Condition: 3
3. Process created successfully (wbpu) memory used: 1145, start time: 3). Condition: 3
3. Process created successfully (zptn) memory used: 748, start time: 3). Condition: 3
```

