

O-PSO input:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	vriaje	job	Obj00	Obj10	Obj20	Obj01	Obj11	Obj21	Obj02	Obj12	Obj22	Obj03	Obj13	Obj23	Obj04	Obj14	Obj24	Obj05
0	Expo	0	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
1	Expo	1	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
2	Expo	2	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
3	Expo	3	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
4	Expo	4	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
5	Expo	5	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
6	Expo	6	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
7	Expo	7	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
8	Expo	8	96.33191	-470	3.617021	105.0762	-315	5.714286	102.4115	-243	5.349794	112.6325	-498	6.827309	100.8954	-497	4.828974	108.8617
9	Impo	9	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
10	Impo	10	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
11	Impo	11	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
12	Impo	12	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
13	Impo	13	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
14	Impo	14	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
15	Impo	15	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
16	Impo	16	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
17	Impo	17	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
18	Impo	18	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
19	Impo	19	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
20	Impo	20	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
21	Impo	21	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
22	Impo	22	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
23	Impo	23	69.49686	-477	7.337526	76.56369	-314	5.414013	64.21839	-261	6.896552	74.30474	-548	7.481752	72.39894	-564	6.560284	75.74609
24	Loca	24	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419
25	Loca	25	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419
26	Loca	26	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419
27	Loca	27	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419
28	Loca	28	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419
29	Loca	29	24.49074	-108	0	15.41176	-68	0	28.01818	-55	0	21.46893	-177	0	14.83766	-154	0	18.34419

The instances are in .csv format. The first column is called job and is the job index, the following columns are prefixed with Obj followed by the objective and machine index, e.g:

Obj00: Objective 0 (raw material cost) in machine 0

Obj10: Objective 1 (time cost) in machine 0

Machine and task indexes start at 0 for all instances.

The instances are separated by folder, each folder is named as follows:

100_5: these are the instances of 100 jobs and 5 machines.

100_10: these are the instances of 100 jobs and 10 machines.

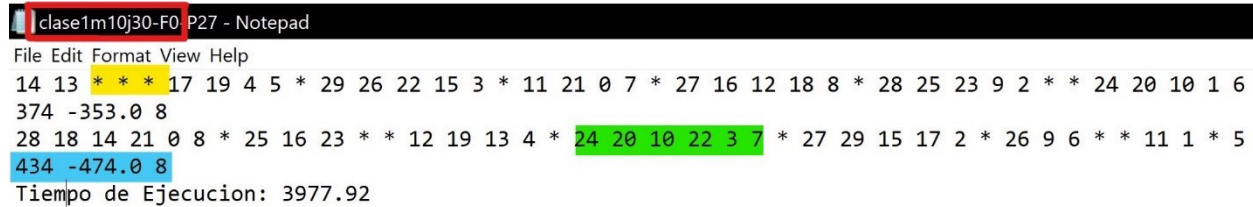
Up to 500_15 for instances of 500 jobs and 15 machines.

Finally, the name of each file is as follows:

i100-5-clase1.csv

Number of jobs – number of machines - class, in total there are 5 classes (EDPSO case).

O-PSO output:



```
File Edit Format View Help
14 13 * * * 17 19 4 5 * 29 26 22 15 3 * 11 21 0 7 * 27 16 12 18 8 * 28 25 23 9 2 * * 24 20 10 1 6
374 -353.0 8
28 18 14 21 0 8 * 25 16 23 * * 12 19 13 4 * 24 20 10 22 3 7 * 27 29 15 17 2 * 26 9 6 * * 11 1 * 5
434 -474.0 8
Tiempo de Ejecucion: 3977.92
```

Once the instance to be solved and the parameters are defined O-PSO can start the schedule optimization process. At the end of this activity is delivered a series of .txt files as in Figure 3 in paper, in relation to the number of fronts generated O-PSO. The files are identified as indicated in the section framed in red, starting with the name of the instance, then the number of machines and jobs, to finish with the corresponding front.

Each of the files contains the structure of the solutions as shown in Figure 3 in paper (page 29), where the symbols underlined in yellow serve to identify the machines and are arranged in ascending order, ie the first symbol that is in the schedule corresponds to the machine 0 and the last corresponds to the machine $M - 2$, since for the machine $M - 1$ no identifier is needed. It is important to mention that, as shown in Figure 1, to access the information of the machines the identifiers are from 0 to $M - 1$.

That said, the green underline part (Figure 3 in paper) are the indexes of the sequence of tasks assigned to machine four, it should be noted that the indexes after the last * in the schedule correspond to the sequence of tasks for machine $M-1$ and, as in the case of the yellow section (Figure 3 in paper), indicates that the machines one and two were not assigned task. Finally, the blue underlined part (Figure 3 in paper) is the cost of each of the objectives in case of the implementing the probability of revision in the customs for the tasks of export and import.