ALGORITMO VORAZ (PSEUDOCÓDIGO)					
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion
ID1	20	1	12,00	0,421	{ 3, 12, 11, 0, 18 }
ID1	20	2	12,00	0,515	{ 3, 12, 11, 0, 18 }
ID1	20	3	12,00	0,371	{ 3, 12, 11, 0, 18 }
ID1	20	4	12,00	0,381	{ 3, 12, 11, 0, 18 }
ID1	20	5	12,00	0,379	{ 3, 12, 11, 0, 18 }
ID1	20	6	12,00	0,369	{ 3, 12, 11, 0, 18 }
ID1	20	7	12,00	0,478	{ 3, 12, 11, 0, 18 }
ID1	20	8	12,00	0,591	{ 3, 12, 11, 0, 18 }
ID1	20	9	8,80	0,367	{ 6, 10, 5, 17, 19 }
ID1	20	10	8,80	0,572	{ 6, 10, 5, 17, 19 }
ID2	50	1	21,36	6,450	{ 2, 45, 33, 24 ,44, 27, 9, 23, 43, 49, 16 }
ID2	50	2	17,70	5,642	{ 7, 26, 28, 12, 13, 11, 20, 6, 32, 15 }
ID2	50	3	23,13	4,610	{ 9, 33, 27, 44, 45, 24, 23, 43 }
ID2	50	4	23,13	5,026	{ 9, 33, 27, 44, 45, 24, 23, 43 }
ID2	50	5	20,71	11,138	{ 13, 39, 34, 47, 41, 7, 49, 4, 29, 5, 36, 22, 27, 44, 9, 12, 30 }
ID2	50	6	19,55	7,242	{ 14, 33, 48, 3, 29, 24, 42, 5, 25, 27, 34 }
ID2	50	7	16,71	3,849	{ 12, 15, 13, 28, 6, 26, 7 }
ID2	50	8	22,31	7,435	{ 29, 30, 36, 41, 49, 4, 34, 27, 5, 22, 39, 44, 9 }
ID2	50	9	22,14	8,291	{ 36, 41, 47, 34, 39, 29, 30, 4, 49, 22, 5, 27, 44, 9 }
ID2	50	10	20,71	11,625	{ 13, 39, 34, 47, 41, 7, 49, 4, 29, 5, 36, 22, 27, 44, 9, 12, 30 }
ID3	70	1	22,4615	14,237	{ 32, 67, 36, 41, 54, 29, 42, 26, 5, 63, 59, 9, 0 }
ID3	70	2	22,8125	23,040	{ 10, 14, 18, 31, 51, 54, 55, 30, 46, 64, 25, 56, 28, 17, 24, 69 }
ID3	70	3	25,2381	24,685	{ 6, 31, 50, 13, 66, 56, 4, 17, 22, 0, 43, 14, 44, 47, 9, 64, 68, 28, 40, 21, 30 }
ID3	70	4	24,8889	20,167	{ 22, 23, 35, 18, 10, 31, 66, 68, 40, 14, 44, 0, 13, 4, 17, 56, 47, 36 }
ID3	70	5	22,4615	14,539	{ 29, 67, 41, 54, 42, 32, 36, 26, 5, 63, 59, 9, 0 }
ID3	70	6	24,7368	21,549	{ 19, 35, 41, 39, 16, 28, 14, 17, 47, 0, 68, 13, 33, 44, 59, 9, 15, 3, 58 }
ID3	70	7	23,6000	16,930	{ 9, 48, 5, 32, 66, 56, 62, 39, 33, 13, 27, 4, 58, 68, 44 }
ID3	70	8	24,6190	23,530	{ 6, 62, 31, 13, 56, 66, 4, 50, 64, 43, 9, 47, 48, 32, 0, 33, 17, 14, 39, 44, 68 }
ID3	70	9	27,9444	21,158	{ 48, 57, 33, 4, 58, 12, 68, 59, 44, 0, 47, 36, 23, 35, 17, 22, 45, 20 }
ID3	70	10	23,4375	18,055	{ 29, 60, 26, 43, 64, 9, 47, 42, 59, 50, 6, 0, 63, 30, 53, 12 }
ID4	100	1	37,1471	77,788	{ 79, 88, 24, 52, 80, 33, 87, 44, 12, 4, 91, 14, 37, 10, 84, 27, 59, 54, 34, 22, 35, 67, 83, 76, 85, 11, 13, 17, 77, 93, 46, 3, 63, 21 }
ID4	100	2	31,129	70,224	{ 78, 89, 40, 55, 84, 73, 27, 94, 56, 45, 5, 90, 53, 51, 21, 86, 97, 18, 59, 34, 74, 20, 22, 3, 85, 76, 46, 17, 67, 69, 6 }
ID4	100	3	34,0833	57,121	{ 69, 74, 20, 21, 97, 53, 43, 16, 46, 94, 3, 5, 34, 51, 67, 70, 82, 76, 17, 48, 23, 39, 72, 58 }
ID4	100	4	39,2308	57,696	{ 12, 53, 25, 35, 93, 44, 36, 4, 21, 92, 87, 27, 82, 24, 80, 34, 11, 8, 3, 72, 97, 1, 85, 18, 37, 68 }
ID4	100	5	32,3333	47,668	{ 50, 87, 16, 57, 39, 5, 43, 53, 74, 52, 97, 34, 12, 20, 6, 83, 27, 24, 92, 18, 1 }
ID4	100	6	32,6500	43,813	{ 52, 92, 47, 12, 1, 36, 53, 49, 35, 27, 44, 97, 66, 74, 34, 87, 7, 60, 68, 41 }
ID4	100	7	39,2941	76,065	{ 5, 50, 39, 18, 27, 6, 34, 53, 56, 87, 51, 25, 12, 8, 93, 62, 35, 3, 17, 72, 85, 1, 92, 24, 11, 36, 4, 44, 82, 68, 21, 15, 37, 74 }
ID4	100	8	35,7143	66,348	{ 56, 71, 21, 78, 15, 53, 94, 0, 34, 87, 6, 3, 39, 51, 72, 5, 8, 50, 82, 24, 93, 62, 92, 25, 4, 75, 45, 36 }
ID4	100	9	39,8889	60,738	{ 44, 80, 33, 24, 4, 12, 79, 84, 35, 27, 99, 93, 11, 37, 85, 3, 36, 34, 87, 92, 72, 82, 18, 25, 1, 17, 76 }
ID4	100	10	36,3333	100,479	{ 60, 87, 34, 54, 51, 22, 5, 7, 67, 85, 76, 84, 3, 94, 79, 35, 63, 4, 24, 40, 59, 46, 44, 97, 20, 21, 53, 74, 69, 83, 92, 43, 12, 36, 18, 27, 42, 89, 11, 72, 82, 17, 30, 68, 93 }

ALGORITMO VORAZ (PSEUDOCÓDIGO)		
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	11,36	0,444
50	20,74	7,131
70	24,22002	19,789
100	35,78041	65,794

					SEGUNDO ALGORITMO VORAZ				SEGUNDO ALGORITMO VORAZ	
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion		Numero nodos	Media Md	Media Tiempo CPU (ms)
ID1	20	1	12,1429	1,727	{ 0, 7, 8, 14, 17, 18, 19 }		20	12,1429	1,700
ID1	20	2	12,1429	1,429	{ 0, 7, 8, 14, 17, 18, 19 }		50	20,89	28,999
ID1	20	3	12,1429	1,403	{ 0, 7, 8, 14, 17, 18, 19 }		70	25,2414	115,4853
ID1	20	4	12,1429	2,261	{ 0, 7, 8, 14, 17, 18, 19 }		100	39,9697	381,465
ID1	20	5	12,1429	1,401	{ 0, 7, 8, 14, 17, 18, 19 }				
ID1	20	6	12,1429	1,873	{ 0, 7, 8, 14, 17, 18, 19 }				
ID1	20	7	12,1429	1,716	{ 0, 7, 8, 14, 17, 18, 19 }				
ID1	20	8	12,1429	1,405	{ 0, 7, 8, 14, 17, 18, 19 }				
ID1	20	9	12,1429	2,055	{ 0, 7, 8, 14, 17, 18, 19 }				
ID1	20	10	12,1429	1,728	{ 0, 7, 8, 14, 17, 18, 19 }				
ID2	50	1	20,89	27,181	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	2	20,89	30,475	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	3	20,89	28,130	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	4	20,89	28,698	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	5	20,89	28,727	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	6	20,89	28,816	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	7	20,89	31,848	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	8	20,89	29,205	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	9	20,89	28,424	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID2	50	10	20,89	28,483	{ 1, 3, 5, 10, 14, 24, 25, 27, 29, 30, 33, 34, 36, 41, 42, 43, 48, 49 }				
ID3	70	1	25,2414	83,565	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	2	25,2414	88,352	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	3	25,2414	113,449	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	4	25,2414	139,406	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	5	25,2414	288,014	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	6	25,2414	86,031	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	7	25,2414	88,359	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	8	25,2414	93,589	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	9	25,2414	88,332	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID3	70	10	25,2414	85,756	{ 0, 4, 7, 9, 12, 13, 14, 15, 17, 20, 29, 30, 33, 36, 37, 38, 39, 43, 44, 47, 48, 50, 53, 55, 56, 57, 59, 61, 68 }				
ID4	100	1	39,9697	330,638	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	2	39,9697	371,341	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	3	39,9697	353,385	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	4	39,9697	395,794	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	5	39,9697	395,556	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	6	39,9697	380,847	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	7	39,9697	420,385	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	8	39,9697	400,349	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	9	39,9697	372,347	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				
ID4	100	10	39,9697	394,008	{ 3, 4, 11, 17, 18, 21, 22, 23, 24, 27, 32, 34, 35, 36, 37, 42, 44, 46, 54, 67, 68, 72, 75, 76, 77, 82, 83, 84, 85, 87, 92, 93, 97 }				

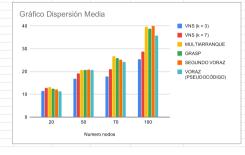| ALGORITMO GRASP								
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion	Iteraciones con mejora	Iteraciones sin mejora	Búsqueda Local
ID1	20	1	12,8571	24,152	{ 0, 7, 8, 18, 17, 19, 11 }			
ID1	20	2	12,5000	12,218	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	3	12,5000	13,444	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	4	12,5000	12,383	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	5	12,5000	22,864	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	6	12,5000	13,946	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	7	12,5000	13,367	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	8	12,5000	12,262	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	9	12,5000	12,913	{ 0, 15, 7, 13, 1, 18 }			
ID1	20	10	12,5000	12,238	{ 0, 15, 7, 13, 1, 18 }			
ID2	50	1	20,2143	191,303	{ 9, 49, 44, 33, 27, 43, 29, 36, 14, 45, 41, 30, 5, 24 }			
ID2	50	2	23,1250	350,372	{ 33, 44, 9, 27, 43, 45, 24, 23 }			
ID2	50	3	20,5455	359,818	{ 5, 36, 34, 22, 4, 39, 47, 44, 41, 49, 27 }			
ID2	50	4	20,4118	198,380	{ 5, 22, 44, 49, 34, 41, 27, 9, 38, 36, 0, 33, 4, 10, 43, 8, 29 }			
ID2	50	5	20,4118	202,885	{ 5, 22, 44, 49, 34, 41, 27, 9, 38, 36, 0, 33, 4, 10, 43, 8, 29 }			
ID2	50	6	20,7273	255,723	{ 49, 4, 41, 30, 34, 27, 22, 44, 39, 36, 8 }			
ID2	50	7	19,7692	108,265	{ 44, 33, 5, 24, 43, 27, 3, 45, 9, 15, 23, 6, 12 }	100	10	Greedy
ID2	50	8	20,9231	193,974	{ 30, 29, 36, 41, 5, 34, 49, 44, 27, 25, 38, 4, 22 }			
ID2	50	9	20,9231	194,341	{ 30, 29, 36, 41, 5, 34, 49, 44, 27, 25, 38, 4, 22 }			
ID2	50	10	20,7333	322,281	{ 27, 44, 25, 5, 4, 49, 30, 0, 34, 21, 29, 17, 22, 46, 38 }			
ID3	70	1	26,1333	964,314	{ 12, 56, 58, 33, 68, 13, 48, 47, 36, 44, 0, 59, 4, 17, 57 }			
ID3	70	2	24,8696	525,037	{ 43, 29, 44, 64, 3, 14, 9, 41, 11, 56, 53, 69, 50, 61, 60, 30, 13, 67, 0, 34, 7, 47, 68 }			
ID3	70	3	25,5789	1.066,108	{ 33, 59, 63, 14, 44, 36, 55, 17, 29, 13, 30, 37, 0, 68, 9, 39, 12, 49, 38 }			
ID3	70	4	26,4737	1.507,267	{ 56, 17, 0, 55, 36, 47, 14, 12, 59, 9, 68, 30, 33, 13, 48, 39, 44, 37, 38 }			
ID3	70	5	25,6	1.250,894	{ 30, 69, 36, 59, 41, 0, 68, 47, 45, 17, 51, 12, 60, 14, 33 }			
ID3	70	6	26,4375	831,167	{ 59, 36, 0, 9, 17, 44, 14, 47, 12, 68, 33, 48, 13, 4, 39, 30 }			
ID3	70	7	27,0526	822,275	{ 33, 56, 68, 35, 44, 14, 17, 0, 59, 58, 12, 4, 47, 48, 57, 16, 13, 39, 36 }			
ID3	70	8	27,5625	985,264	{ 36, 0, 56, 14, 44, 59, 12, 33, 13, 47, 17, 39, 68, 48, 4, 9 }			
ID3	70	9	24,3571	402,426	{ 0, 47, 68, 56, 14, 33, 13, 17, 44, 35, 4, 15, 22, 39 }			
ID3	70	10	25,25	864,158	{ 59, 49, 3, 17, 30, 44, 20, 15, 12, 35, 33, 0, 19, 46, 39, 58, 69, 63, 55, 16 }			
ID4	100	1	40,0645	3.794,336	{ 36, 5, 68, 18, 87, 24, 42, 72, 11, 97, 82, 23, 37, 35, 85, 74, 92, 94, 34, 67, 17, 76, 4, 3, 32, 84, 21, 22, 44, 27, 93 }			
ID4	100	2	39,0345	2.346,563	{ 35, 76, 21, 72, 24, 22, 87, 53, 94, 82, 27, 4, 68, 44, 3, 84, 97, 34, 36, 42, 23, 85, 17, 93, 11, 18, 63, 79, 5 }			
ID4	100	3	37,5806	2.586,688	{ 5, 17, 97, 85, 27, 34, 72, 36, 83, 35, 87, 3, 11, 67, 37, 39, 6, 76, 74, 53, 93, 94, 24, 1, 96, 68, 18, 50, 30, 62, 89 }			
ID4	100	4	39,1481	3.915,495	{ 24, 82, 74, 35, 97, 34, 37, 27, 72, 11, 3, 87, 21, 66, 93, 85, 92, 44, 53, 94, 4, 42, 36, 23, 18, 76, 68 }			
ID4	100	5	38,8667	1.378,152	{ 21, 34, 53, 3, 44, 5, 87, 35, 67, 93, 36, 94, 12, 72, 17, 74, 22, 92, 79, 84, 76, 24, 27, 11, 97, 18, 4, 46, 20, 85 }			
ID4	100	6	38,0645	3.112,008	{ 85, 93, 21, 74, 76, 3, 82, 34, 18, 4, 37, 36, 46, 87, 44, 84, 11, 35, 20, 24, 92, 27, 67, 97, 17, 79, 54, 94, 83, 12, 53 }			
ID4	100	7	39,5312	1.681,636	{ 34, 18, 37, 76, 36, 4, 83, 44, 74, 3, 42, 72, 46, 82, 21, 94, 22, 35, 67, 97, 85, 54, 93, 92, 11, 84, 87, 27, 79, 75, 24, 68 }			
ID4	100	8	38,6154	2.314,904	{ 17, 53, 5, 74, 4, 76, 85, 34, 89, 92, 11, 24, 42, 97, 87, 18, 94, 82, 44, 35, 27, 36, 72, 3, 93, 21 }			
ID4	100	9	38,7857	2.139,135	{ 4, 36, 93, 22, 24, 76, 27, 11, 82, 3, 92, 85, 87, 35, 60, 72, 21, 44, 68, 83, 23, 54, 63, 84, 34, 42, 97, 66 }			
ID4	100	10	38,4643	1.887,742	{ 23, 82, 87, 83, 72, 84, 35, 21, 36, 54, 42, 11, 18, 3, 5, 76, 63, 34, 22, 67, 88, 24, 94, 92, 4, 79, 46, 97 }			

ALGORITMO GRASP		
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,5357	14,979
50	20,7784	237,734
70	25,93152	921,891
100	38,81555	2.515,666

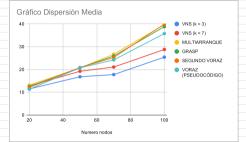|	ALGORITMO MULTIARRANQUE										ALGORITMO MULTIARRANQUE	
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion	Iteraciones con mejora	Iteraciones sin mejora	Búsqueda Local		Numero nodos	Media Md	Media Tiempo CPU (ms)
ID1	20	1	13,1667	8,366	{ 14, 7, 8, 16, 4, 17 }					20	13,1667	8,737
ID1	20	2	13,1667	9,314	{ 14, 7, 8, 16, 4, 17 }					50	20,6866	76,455
ID1	20	3	13,1667	8,202	{ 14, 7, 8, 16, 4, 17 }					70	26,71535	285,022
ID1	20	4	13,1667	8,982	{ 14, 7, 8, 16, 4, 17 }					100	39,68624	658,741
ID1	20	5	13,1667	8,566	{ 14, 7, 8, 16, 4, 17 }							
ID1	20	6	13,1667	8,573	{ 14, 7, 8, 16, 4, 17 }							
ID1	20	7	13,1667	9,987	{ 14, 7, 8, 16, 4, 17 }							
ID1	20	8	13,1667	8,292	{ 14, 7, 8, 16, 4, 17 }							
ID1	20	9	13,1667	9,004	{ 14, 7, 8, 16, 4, 17 }							
ID1	20	10	13,1667	8,079	{ 14, 7, 8, 16, 4, 17 }							
ID2	50	1	21,8333	65,883	{ 22, 5, 9, 36, 49, 30, 29, 41, 27, 44, 4, 34 }							
ID2	50	2	20,3125	65,792	{ 3, 4, 14, 34, 5, 48, 25, 41, 30, 49, 15, 27, 36, 24, 29, 42 }							
ID2	50	3	20,3125	62,984	{ 3, 4, 14, 34, 5, 48, 25, 41, 30, 49, 15, 27, 36, 24, 29, 42 }							
ID2	50	4	20,3125	65,610	{ 3, 4, 14, 34, 5, 48, 25, 41, 30, 49, 15, 27, 36, 24, 29, 42 }							
ID2	50	5	20,8889	90,205	{ 49, 14, 24, 25, 41, 43, 1, 48, 36, 33, 42, 3, 10, 27, 34, 30, 5, 29 }							
ID2	50	6	20,8889	39,646	{ 49, 14, 24, 25, 41, 43, 1, 48, 36, 33, 42, 3, 10, 27, 34, 30, 5, 29 }	100	10	Greedy				
ID2	50	7	20,3684	94,718	{ 10, 30, 27, 15, 41, 17, 34, 44, 5, 33, 14, 45, 29, 2, 49, 4, 24, 3, 1 }							
ID2	50	8	20,3684	98,603	{ 10, 30, 27, 15, 41, 17, 34, 44, 5, 33, 14, 45, 29, 2, 49, 4, 24, 3, 1 }							
ID2	50	9	20,3684	95,836	{ 10, 30, 27, 15, 41, 17, 34, 44, 5, 33, 14, 45, 29, 2, 49, 4, 24, 3, 1 }							
ID2	50	10	21,2118	85,276	{ 27, 43, 4, 5, 33, 44, 34, 30, 41, 49, 2, 29, 9, 36, 45, 14, 24 }							
ID3	70	1	25,2083	186,251	{ 63, 51, 59, 29, 3, 64, 12, 46, 53, 9, 14, 50, 47, 0, 43, 60, 30, 44, 67, 38, 17, 69, 49, 11 }							
ID3	70	2	27,35	175,027	{ 16, 14, 40, 22, 23, 12, 33, 31, 44, 68, 4, 36, 2, 35, 59, 47, 41, 0, 17, 13 }							
ID3	70	3	25,6538	371,322	{ 47, 61, 35, 9, 17, 7, 31, 43, 28, 22, 56, 15, 3, 64, 0, 21, 30, 50, 44, 13, 4, 67, 14, 41, 68, 53 }							
ID3	70	4	27,3333	188,194	{ 23, 47, 35, 60, 69, 0, 31, 45, 14, 36, 16, 59, 41, 51, 68, 44, 33, 21, 3, 17, 67 }							
ID3	70	5	28	493,872	{ 36, 3, 41, 17, 47, 31, 0, 14, 23, 60, 51, 30, 35, 45, 44, 21, 59, 67, 68, 69, 22 }							
ID3	70	6	25,4783	252,878	{ 38, 59, 50, 48, 47, 30, 4, 36, 63, 56, 12, 14, 13, 43, 44, 53, 33, 9, 64, 39, 17, 0, 37 }							
ID3	70	7	27,2727	373,278	{ 17, 30, 41, 19, 36, 67, 69, 13, 0, 14, 3, 45, 44, 35, 68, 47, 51, 21, 11, 31, 59, 60 }							
ID3	70	8	25,8571	191,246	{ 21, 47, 59, 0, 3, 68, 50, 64, 69, 34, 13, 56, 29, 67, 39, 14, 9, 15, 44, 35, 41, 33, 61, 28, 30, 60, 17, 53 }							
ID3	70	9	28	377,262	{ 0, 21, 44, 14, 47, 17, 31, 51, 36, 68, 30, 23, 59, 45, 41, 69, 3, 60, 67, 35, 22 }							
ID3	70	10	27	240,889	{ 21, 67, 14, 45, 29, 47, 51, 0, 44, 68, 41, 60, 3, 36, 69, 59 }							
ID4	100	1	40,0769	1.160,099	{ 97, 42, 82, 79, 91, 46, 68, 72, 94, 18, 44, 22, 24, 36, 17, 67, 21, 5, 37, 59, 11, 88, 93, 63, 54, 23, 27, 84, 34, 85, 53, 35, 39, 87, 90, 76, 3, 15, 4 }							
ID4	100	2	39,9697	467,809	{ 27, 93, 4, 11, 83, 68, 46, 92, 22, 75, 77, 24, 34, 97, 76, 72, 87, 18, 37, 32, 3, 67, 21, 54, 17, 84, 42, 82, 35, 36, 85, 44, 23 }							
ID4	100	3	38,7429	341,394	{ 34, 97, 36, 66, 68, 21, 23, 89, 82, 85, 37, 4, 24, 84, 44, 87, 76, 74, 69, 32, 20, 18, 46, 5, 22, 92, 35, 3, 11, 77, 42, 17, 27, 67, 54 }							
ID4	100	4	40,5938	713,867	{ 27, 36, 12, 84, 4, 17, 79, 82, 24, 22, 93, 85, 46, 53, 42, 97, 72, 11, 74, 18, 44, 76, 34, 94, 20, 35, 87, 59, 21, 5, 92, 3 }							
ID4	100	5	40,7895	948,383	{ 53, 72, 77, 89, 23, 93, 27, 17, 4, 76, 42, 21, 46, 11, 35, 37, 18, 67, 20, 97, 92, 3, 83, 44, 85, 82, 22, 74, 87, 69, 94, 68, 36, 84, 34, 24, 5, 32 }							
ID4	100	6	38,5946	546,916	{ 12, 34, 42, 79, 84, 46, 3, 27, 11, 72, 21, 91, 18, 83, 17, 44, 97, 77, 35, 87, 23, 4, 88, 36, 76, 67, 93, 80, 85, 22, 37, 33, 59, 54, 92, 82, 24 }							
ID4	100	7	40,8649	710,847	{ 54, 5, 77, 34, 42, 18, 87, 37, 84, 82, 3, 46, 27, 4, 69, 32, 76, 23, 72, 24, 68, 21, 97, 22, 44, 93, 66, 17, 35, 67, 92, 85, 36, 74, 11, 89, 94 }							
ID4	100	8	39,2857	845,782	{ 76, 18, 21, 85, 66, 27, 37, 54, 32, 35, 93, 17, 42, 23, 4, 72, 77, 34, 11, 92, 82, 44, 84, 68, 22, 24, 87, 36 }							
ID4	100	9	37,25	282,005	{ 20, 92, 18, 36, 22, 35, 76, 8, 69, 53, 25, 84, 3, 42, 97, 85, 5, 66, 37, 74, 51, 23, 21, 4, 54, 27, 34, 11, 75, 32, 46, 87, 68, 24, 82, 67 }							
ID4	100	10	40,6944	570,304	{ 5, 89, 17, 54, 66, 32, 23, 36, 68, 74, 87, 3, 37, 11, 44, 93, 27, 67, 22, 82, 21, 35, 77, 84, 24, 4, 34, 97, 42, 94, 18, 92, 46, 76, 85, 72 }							

	ALGORITMO VNS											ALGORITMO VNS	
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion	Iteraciones con mejora	Iteraciones sin mejora	Búsqueda Local	Tamaño del entorno		Numero nodos	Media Md	Media Tiempo CPU (ms)	
ID1	20	1	11,5000	2,178	{ 19, 5, 0, 1 }						20	11,5000	2,403	
ID1	20	2	11,5000	2,326	{ 19, 5, 0, 1 }						50	16,8383	11,188	
ID1	20	3	11,5000	2,135	{ 19, 5, 0, 1 }						70	17,77929	21,194	
ID1	20	4	11,5000	2,238	{ 19, 5, 0, 1 }						100	25,43849	73,028	
ID1	20	5	11,5000	2,230	{ 19, 5, 0, 1 }									
ID1	20	6	11,5000	2,094	{ 19, 5, 0, 1 }									
ID1	20	7	11,5000	2,280	{ 19, 5, 0, 1 }									
ID1	20	8	11,5000	2,943	{ 19, 5, 0, 1 }									
ID1	20	9	11,5000	2,418	{ 19, 5, 0, 1 }									
ID1	20	10	11,5000	3,187	{ 19, 5, 0, 1 }									
ID2	50	1	21,5000	9,803	{ 45, 27, 24, 4, 21, 23, 44, 25 }									
ID2	50	2	21,5000	11,293	{ 45, 27, 24, 4, 21, 23, 44, 25 }									
ID2	50	3	21,5000	10,297	{ 45, 27, 24, 4, 21, 23, 44, 25 }									
ID2	50	4	16,6250	6,803	{ 25, 48, 24, 27, 33, 3, 45, 15 }									
ID2	50	5	16,6250	6,205	{ 25, 48, 24, 27, 33, 3, 45, 15 }									
ID2	50	6	18,8333	24,628	{ 9, 21, 27, 45, 23, 44 }									
ID2	50	7	18,8333	24,840	{ 9, 21, 27, 45, 23, 44 }									
ID2	50	8	8,3333	2,797	{ 32, 48, 11 }									
ID2	50	9	8,3333	3,035	{ 32, 48, 11 }									
ID2	50	10	16,3000	12,182	{ 34, 27, 4, 15, 47, 24, 33, 5, 3, 41 }	100	10	Greedy	3					
ID3	70	1	10,5	4,034	{ 49, 12, 39, 68 }									
ID3	70	2	10,5	4,561	{ 49, 12, 39, 68 }									
ID3	70	3	8,75	5,484	{ 60, 52, 69, 24 }									
ID3	70	4	21,7857	28,305	{ 47, 31, 44, 0, 59, 69, 9, 11, 17, 38, 51, 13, 46, 14 }									
ID3	70	5	17,6	12,227	{ 12, 64, 40, 4, 60, 56, 47, 21, 49, 68 }									
ID3	70	6	20,3	15,931	{ 68, 0, 9, 14, 13, 39, 44, 46, 40, 38 }									
ID3	70	7	22,8125	35,087	{ 0, 15, 58, 3, 59, 47, 17, 68, 35, 44, 69, 56, 13, 14, 11, 7 }									
ID3	70	8	24,1429	52,878	{ 47, 35, 15, 0, 21, 22, 44, 68, 4, 66, 56, 40, 1, 13 }									
ID3	70	9	22,8462	31,960	{ 56, 68, 9, 14, 33, 13, 0, 47, 64, 59, 39, 4, 44 }									
ID3	70	10	18,5556	21,471	{ 33, 54, 41, 45, 31, 27, 14, 51, 10 }									
ID4	100	1	19,5	24,675	{ 87, 81, 36, 56, 49, 17, 79, 39, 58, 93, 72, 94 }									
ID4	100	2	33,5556	104,372	{ 34, 25, 85, 76, 67, 87, 4, 72, 35, 69, 3, 21, 97, 80, 93, 27, 53, 37, 20, 11, 92, 77, 46, 44, 36, 94, 82 }									
ID4	100	3	35,069	101,639	{ 44, 21, 32, 37, 35, 76, 74, 36, 92, 11, 72, 34, 82, 24, 20, 46, 3, 75, 85, 16, 67, 4, 28, 29, 22, 97, 17, 69, 94 }									
ID4	100	4	16,4286	17,941	{ 46, 87, 84, 79, 63, 54, 14 }									
ID4	100	5	29,9091	63,129	{ 34, 46, 11, 4, 79, 64, 44, 17, 82, 87, 18, 94, 16, 84, 72, 36, 22, 3, 26, 54, 23, 93 }									
ID4	100	6	19,381	38,859	{ 82, 85, 5, 72, 65, 13, 74, 16, 67, 4, 84, 41, 46, 70, 54, 26, 40, 34, 37, 68, 19 }									
ID4	100	7	16,6	20,668	{ 22, 74, 38, 54, 21, 88, 97, 92, 34, 7 }									
ID4	100	8	33,4286	213,083	{ 91, 76, 85, 79, 37, 27, 67, 33, 87, 34, 80, 44, 4, 84, 54, 14, 12, 17, 24, 13, 59 }									
ID4	100	9	29,7857	107,893	{ 11, 23, 42, 68, 17, 72, 37, 18, 35, 84, 66, 32, 76, 85 }									
ID4	100	10	20,7273	38,024	{ 59, 79, 22, 20, 3, 76, 34, 18, 94, 4, 24 }									

													ALGORITMO VNS (k = 7)		
					ALGORITMO VNS										
Problema	Numero nodos	Ejecucion	Md	Tiempo CPU (ms)	Mejor Solucion	Iteraciones con mejora	Iteraciones sin mejora	Búsqueda Local	Tamaño del entorno		Numero nodos	Media Md	Media Tiempo CPU (ms)
ID1	20	1	12,8000	2,881	{ 17, 14, 7, 8, 4 }	100	10	Greedy	7		20	12,8000	2,779
ID1	20	2	12,8000	2,421	{ 17, 14, 7, 8, 4 }						50	19,2425	19,203
ID1	20	3	12,8000	2,626	{ 17, 14, 7, 8, 4 }						70	21,09579	45,339
ID1	20	4	12,8000	2,467	{ 17, 14, 7, 8, 4 }						100	28,79981	93,559
ID1	20	5	12,8000	2,989	{ 17, 14, 7, 8, 4 }								
ID1	20	6	12,8000	2,578	{ 17, 14, 7, 8, 4 }								
ID1	20	7	12,8000	2,657	{ 17, 14, 7, 8, 4 }								
ID1	20	8	12,8000	2,453	{ 17, 14, 7, 8, 4 }								
ID1	20	9	12,8000	3,649	{ 17, 14, 7, 8, 4 }								
ID1	20	10	12,8000	3,073	{ 17, 14, 7, 8, 4 }								
ID2	50	1	20,0000	18,829	{ 36, 22, 27, 34, 2, 30, 4, 29, 44, 17, 49, 41 }								
ID2	50	2	20,0000	19,088	{ 36, 22, 27, 34, 2, 30, 4, 29, 44, 17, 49, 41 }								
ID2	50	3	19,4615	20,288	{ 34, 36, 47, 4, 5, 30, 33, 41, 9, 18, 27, 49, 29 }								
ID2	50	4	19,4615	21,338	{ 34, 36, 47, 4, 5, 30, 33, 41, 9, 18, 27, 49, 29 }								
ID2	50	5	16,5556	12,588	{ 16, 25, 18, 32, 29, 48, 36, 30, 49 }								
ID2	50	6	16,5556	12,657	{ 16, 25, 18, 32, 29, 48, 36, 30, 49 }								
ID2	50	7	19,7692	18,828	{ 30, 44, 5, 36, 41, 27, 22, 9, 33, 29, 49, 12, 43 }								
ID2	50	8	19,7692	18,857	{ 30, 44, 5, 36, 41, 27, 22, 9, 33, 29, 49, 12, 43 }								
ID2	50	9	19,7692	18,456	{ 30, 44, 5, 36, 41, 27, 22, 9, 33, 29, 49, 12, 43 }								
ID2	50	10	21,0833	31,100	{ 34, 47, 49, 22, 5, 41, 44, 4, 29, 39, 36, 27 }								
ID3	70	1	23,875	37,088	{ 46, 14, 51, 44, 69, 67, 17, 11, 0, 3, 31, 30, 9, 59, 13, 38 }								
ID3	70	2	23,8867	116,573	{ 30, 12, 56, 68, 33, 64, 4, 59, 48, 44, 0, 58, 47, 9, 50, }								
ID3	70	3	21,1538	29,511	{ 36, 47, 43, 9, 14, 0, 56, 59, 4, 68, 48, 13, 66 }								
ID3	70	4	24,6667	76,952	{ 41, 13, 44, 14, 17, 29, 68, 67, 69, 3, 35, 36, 33, 47, 0, 60, 59, 56 }								
ID3	70	5	23,1667	33,645	{ 56, 20, 61, 0, 57, 39, 15, 33, 68, 55, 17, 58, 59, 35, 62, 4, 2, 12 }								
ID3	70	6	23,1667	34,036	{ 56, 20, 61, 0, 57, 39, 15, 33, 68, 55, 17, 58, 59, 35, 62, 4, 2, 12 }								
ID3	70	7	25,8500	67,040	{ 47, 41, 48, 33, 36, 45, 17, 59, 39, 56, 12, 68, 50, 61, 55, 20, 14, 30, 9, 0 }								
ID3	70	8	10,5000	7,946	{ 59, 9, 43, 47 }								
ID3	70	9	16	22,747	{ 45, 47, 36, 41, 21, 67, 30 }								
ID3	70	10	18,6923	27,851	{ 44, 36, 9, 13, 29, 63, 26, 7, 50, 0, 43, 38, 31 }								
ID4	100	1	21,3333	24,244	{ 35, 85, 27, 84, 37, 24, 77, 18, 44 }								
ID4	100	2	33,2714	153,508	{ 97, 35, 75, 87, 37, 68, 44, 84, 85, 11, 76, 36, 93, 13, 34, 63, 72, 54, 23, 67, 83, 27, 81, 60, 91, 42, 50, 30 }								
ID4	100	3	39,8438	130,701	{ 74, 25, 36, 72, 17, 93, 21, 24, 44, 22, 82, 53, 94, 76, 97, 18, 5, 85, 12, 35, 20, 79, 34, 3, 4, 39, 27, 87, 92, 11, 42, 46 }								
ID4	100	4	13	15,095	{ 5, 22, 23, 16, 55, 39 }								
ID4	100	5	39,6296	231,577	{ 94, 36, 74, 85, 27, 76, 53, 21, 17, 18, 68, 42, 82, 24, 93, 92, 4, 87, 44, 22, 34, 11, 35, 5, 97, 72, 3 }								
ID4	100	6	39,6111	150,623	{ 36, 44, 53, 39, 5, 21, 27, 4, 84, 24, 32, 68, 22, 11, 76, 54, 23, 75, 82, 18, 83, 92, 37, 34, 87, 67, 46, 3, 85, 74, 35, 94, 97, 28, 42, 72 }								
ID4	100	7	27,0588	39,407	{ 30, 11, 83, 44, 54, 34, 84, 87, 67, 17, 76, 79, 22, 91, 13, 85, 3 }								
ID4	100	8	22,3846	56,769	{ 60, 37, 67, 66, 43, 70, 68, 35, 54, 85, 84, 51, 13 }								
ID4	100	9	22,5455	44,466	{ 3, 79, 60, 5, 91, 8, 87, 54, 63, 4, 34 }								
ID4	100	10	29,32	89,195	{ 23, 46, 82, 84, 35, 76, 42, 3, 44, 34, 8, 59, 17, 25, 18, 21, 64, 14, 4, 63, 53, 54, 36, 91, 48 }								

	ALGORITMO VNS	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	11,5	2,4029
50	16,838326	11,1883
70	17,77929	21,1938
100	25,43849	73,0283

	SEGUNDO ALGORITMO VORAZ	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,1429	1,6998
50	20,88891	28,9987
70	25,2414	115,4853
100	39,9697	381,465

	ALGORITMO MULTIARRANQUE	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	13,1667	8,7365
50	20,68656	76,4553
70	26,71535	285,0219
100	39,68624	658,7406

	ALGORITMO VORAZ (PSEUDOCÓDIGO)	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	11,36	0,4444
50	20,74358	7,1308
70	24,22002	19,789
100	35,78041	65,794

	ALGORITMO GRASP	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,53571	14,9787
50	20,77844	237,7342
70	25,93152	921,891
100	38,81555	2715,6659

	ALGORITMO VNS (k = 7)	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,8	2,7794
50	19,24251	19,2029
70	21,09579	45,3389
100	28,79981	93,5585

Valor medio de la Dispersion Media					
Numero nodos	VNS (k = 3)	VNS (k = 7)	MULTIARRANQUE	GRASP	SEGUNDO VORAZ	VORAZ (PSEUDOCÓDIGO)
20	11,5	12,8	13,1667	12,53571	12,1429	11,36
50	16,838326	19,24251	20,68656	20,77844	20,88891	20,74358
70	17,77929	21,09579	26,71535	25,93152	25,2414	24,22002
100	25,43849	28,79981	39,68624	38,81555	39,9697	35,78041

Gráfico Dispersión Media

Gráfico Dispersión Media

	ALGORITMO VNS	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	11,5	2,4029
50	16,838326	11,1883
70	17,77929	21,1938
100	25,43849	73,0283

	SEGUNDO ALGORITMO VORAZ	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,1429	1,6998
50	20,88891	28,9987
70	25,2414	115,4853
100	39,9697	381,465

	ALGORITMO MULTIARRANQUE	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	13,1667	8,7365
50	20,68656	76,4553
70	26,71535	285,0219
100	39,68624	658,7406

	ALGORITMO VORAZ (PSEUDOCÓDIGO)	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	11,36	0,4444
50	20,74358	7,1308
70	24,22002	19,789
100	35,78041	65,794

	ALGORITMO GRASP	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,53571	14,9787
50	20,77844	237,7342
70	25,93152	921,891
100	38,81555	2515,6659

	ALGORITMO VNS (k = 7)	
Numero nodos	Media Md	Media Tiempo CPU (ms)
20	12,8	2,7794
50	19,24251	19,2029
70	21,09579	45,3389
100	28,79981	93,5585

	Valor medio de la Tiempo Ejecución					
Numero nodos	VNS (k = 3)	VNS (k = 7)	MULTIARRANQUE	GRASP	SEGUNDO VORAZ	VORAZ (PSEUDOCÓDIGO)
20	2,4029	2,7794	8,7365	14,9787	1,6998	0,4444
50	11,1883	19,2029	76,4553	237,7342	28,9987	7,1308
70	21,1938	45,3389	285,0219	921,891	115,4853	19,789
100	73,0283	93,5585	658,7406	2515,6659	381,465	65,794

Gráfico Tiempo de Ejecución