

Appendix: Results of the numerical experiments

Table A1: Proportion [%] of the total waiting time as part of the total processing time for A_1 and the LKH heuristic

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	3.1	3.2	6.4	7.3	13.9	17.5	21.8	33.5
3	(5,25)	1	10	1.5	2.4	3.0	5.3	6.3	12.5	9.9	23.9
3	(5,25)	2	5	1.9	2.9	3.8	6.1	8.2	15.0	12.5	28.6
3	(5,25)	2	10	0.8	1.7	1.8	3.5	3.7	7.8	5.7	13.1
3	(5,25)	3	5	1.4	2.0	2.6	4.2	6.0	9.3	9.2	15.8
3	(5,25)	3	10	0.6	1.2	1.3	2.6	2.7	5.5	4.2	9.1
3	(10,50)	1	5	3.9	4.3	8.0	9.1	16.7	22.1	26.2	40.5
3	(10,50)	1	10	1.9	2.9	3.9	6.5	8.4	14.8	13.0	28.5
3	(10,50)	2	5	2.3	3.4	4.8	7.3	9.8	17.0	15.1	33.1
3	(10,50)	2	10	1.1	1.8	2.3	3.9	4.7	8.8	7.2	14.4
3	(10,50)	3	5	1.6	2.2	3.3	4.6	6.8	10.4	10.6	16.6
3	(10,50)	3	10	0.8	1.4	1.6	2.8	3.2	6.2	5.0	10.1
10	(5,25)	1	5	4.3	5.6	9.2	12.5	18.7	32.6	28.4	50.1
10	(5,25)	1	10	1.8	4.4	4.0	9.7	8.3	25.9	12.8	44.6
10	(5,25)	2	5	2.3	4.7	4.8	10.8	9.9	28.4	15.4	47.1
10	(5,25)	2	10	1.1	2.5	2.2	5.5	4.5	12.3	6.9	20.4
10	(5,25)	3	5	1.7	3.0	3.3	6.4	7.0	14.3	10.7	22.7
10	(5,25)	3	10	0.7	1.7	1.4	3.6	3.0	8.1	4.6	13.1
10	(10,50)	1	5	5.5	7.3	11.3	16.2	22.4	39.9	33.1	56.8
10	(10,50)	1	10	2.6	5.6	5.4	12.4	11.0	32.7	16.5	51.2
10	(10,50)	2	5	2.8	6.1	5.9	13.3	12.0	35.7	18.3	53.4
10	(10,50)	2	10	1.3	3.2	2.8	6.6	5.7	15.0	8.7	23.6
10	(10,50)	3	5	1.9	3.7	4.0	7.6	8.2	16.8	12.3	26.7
10	(10,50)	3	10	0.9	2.0	1.9	4.5	3.8	9.7	5.8	15.3
20	(5,25)	1	5	5.4	8.0	11.1	18.7	22.4	43.4	33.0	59.1
20	(5,25)	1	10	2.4	6.5	5.0	15.0	10.2	38.0	15.6	54.9
20	(5,25)	2	5	2.9	7.0	5.8	16.0	11.7	40.0	17.8	56.4
20	(5,25)	2	10	1.4	3.6	2.5	7.8	5.4	17.1	8.3	27.5
20	(5,25)	3	5	2.0	4.3	4.0	8.6	8.0	19.0	12.1	29.0
20	(5,25)	3	10	0.9	2.4	1.8	4.9	3.6	10.6	5.4	17.0
20	(10,50)	1	5	6.6	9.7	13.3	21.8	26.1	47.7	36.7	62.2
20	(10,50)	1	10	3.1	7.7	6.3	18.0	12.7	44.3	19.4	59.4
20	(10,50)	2	5	3.5	8.0	6.8	19.4	14.0	44.9	20.6	60.3
20	(10,50)	2	10	1.5	4.2	3.2	9.3	6.7	19.8	10.0	31.2
20	(10,50)	3	5	2.2	4.9	4.6	10.1	9.3	21.3	14.1	33.1
20	(10,50)	3	10	1.1	2.8	2.1	5.7	4.3	12.4	6.6	20.3

Table A2: Proportion [%] of the total waiting time as part of the total processing time for A_2 and the LKH heuristic

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	2.3	0.9	4.7	2.0	9.5	4.2	13.9	6.6
3	(5,25)	1	10	1.0	0.6	1.9	1.3	3.9	2.7	5.8	4.3
3	(5,25)	2	5	1.5	0.8	2.9	1.7	5.8	3.7	8.6	5.6
3	(5,25)	2	10	0.6	1.3	1.2	2.7	2.5	5.5	3.7	8.1
3	(5,25)	3	5	1.1	1.6	2.1	3.3	4.4	6.5	6.5	10.3
3	(5,25)	3	10	0.5	0.9	1.0	1.9	1.8	3.8	2.8	5.8
3	(10,50)	1	5	3.2	1.4	6.6	2.8	12.6	5.8	19.0	9.2
3	(10,50)	1	10	1.4	0.9	2.9	1.8	5.8	3.7	8.6	5.8
3	(10,50)	2	5	1.8	1.1	3.8	2.3	7.5	4.6	11.1	7.1
3	(10,50)	2	10	0.8	1.6	1.6	3.5	3.3	6.6	5.0	9.9
3	(10,50)	3	5	1.4	1.9	2.6	4.2	5.2	8.0	7.6	11.9
3	(10,50)	3	10	0.6	1.2	1.1	2.5	2.3	4.7	3.4	7.3
10	(5,25)	1	5	3.2	1.8	6.7	3.5	13.3	7.1	19.2	10.9
10	(5,25)	1	10	1.3	1.1	2.7	2.2	5.3	5.1	8.4	7.6
10	(5,25)	2	5	1.7	1.2	3.8	2.8	7.3	5.5	11.0	8.5
10	(5,25)	2	10	0.9	2.1	1.5	4.1	3.3	8.5	4.7	12.9
10	(5,25)	3	5	1.3	2.4	2.5	5.1	5.3	10.3	7.7	15.0
10	(5,25)	3	10	0.6	1.3	1.1	2.6	2.2	5.8	3.3	8.7
10	(10,50)	1	5	4.5	2.1	9.1	4.1	17.2	8.8	25.0	13.1
10	(10,50)	1	10	1.9	1.5	3.6	2.9	7.4	5.9	11.2	9.1
10	(10,50)	2	5	2.3	1.7	4.8	3.5	9.4	6.6	13.9	10.2
10	(10,50)	2	10	1.0	2.9	2.0	5.4	3.9	11.3	6.0	16.4
10	(10,50)	3	5	1.6	3.2	3.3	6.2	6.3	12.9	9.2	18.5
10	(10,50)	3	10	0.7	1.9	1.3	3.8	2.6	7.7	4.2	11.3
20	(5,25)	1	5	4.5	2.4	8.4	4.7	16.2	9.6	23.5	14.7
20	(5,25)	1	10	1.7	1.7	3.5	3.4	7.0	7.1	10.2	11.3
20	(5,25)	2	5	2.4	2.0	4.5	3.8	8.8	8.2	13.1	12.7
20	(5,25)	2	10	1.0	3.1	2.0	5.8	3.9	11.8	6.0	18.0
20	(5,25)	3	5	1.6	3.5	3.3	6.8	6.3	13.4	9.3	19.7
20	(5,25)	3	10	0.7	1.9	1.4	3.7	3.0	7.8	4.1	11.7
20	(10,50)	1	5	5.7	2.8	10.9	5.5	20.3	10.6	28.6	16.3
20	(10,50)	1	10	2.3	1.9	4.7	4.0	9.1	8.1	13.5	12.3
20	(10,50)	2	5	3.0	2.0	5.7	4.5	10.7	9.0	15.9	13.1
20	(10,50)	2	10	1.1	3.7	2.3	7.5	4.7	15.2	7.1	21.8
20	(10,50)	3	5	1.9	4.5	3.7	8.4	7.4	16.5	10.7	23.8
20	(10,50)	3	10	0.8	2.4	1.6	5.2	3.2	10.1	4.9	15.0

Table A3: Total processing time [hours] when applying A_1 with the S-shape strategy

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	23.8	21.4	24.2	22.1	25.4	24.0	27.7	29.3
3	(5,25)	1	10	33.6	26.2	33.9	26.7	34.8	28.4	35.9	31.5
3	(5,25)	2	5	30.3	23.6	30.8	24.2	31.9	26.4	33.3	30.4
3	(5,25)	2	10	40.2	31.4	40.7	31.9	41.5	33.3	42.5	35.2
3	(5,25)	3	5	36.7	29.6	37.2	30.2	38.2	31.7	39.4	33.5
3	(5,25)	3	10	48.3	37.6	48.7	38.0	49.4	39.1	50.3	40.6
3	(10,50)	1	5	29.5	27.8	30.2	28.8	32.0	32.8	36.4	42.9
3	(10,50)	1	10	41.4	34.7	41.8	35.6	42.9	38.2	43.9	44.3
3	(10,50)	2	5	38.9	31.9	39.5	32.9	40.8	36.2	42.3	43.7
3	(10,50)	2	10	54.7	42.6	55.2	43.2	56.3	44.9	57.5	47.1
3	(10,50)	3	5	48.6	40.1	49.1	40.9	50.2	42.7	51.7	45.1
3	(10,50)	3	10	68.2	52.2	68.6	52.7	69.5	54.1	70.9	55.8
10	(5,25)	1	5	32.8	30.5	33.9	32.5	36.8	41.1	41.4	55.8
10	(5,25)	1	10	42.1	35.3	42.9	36.9	44.4	43.3	46.3	57.2
10	(5,25)	2	5	38.8	32.7	39.6	34.7	41.5	42.4	43.6	56.4
10	(5,25)	2	10	48.7	40.1	49.2	41.2	50.4	44.0	51.9	48.2
10	(5,25)	3	5	45.5	38.2	46.2	39.3	47.7	42.4	49.4	46.7
10	(5,25)	3	10	57.1	45.9	57.5	46.7	58.5	48.6	59.7	51.1
10	(10,50)	1	5	47.3	46.4	49.4	50.7	54.5	70.8	62.4	97.6
10	(10,50)	1	10	58.8	53.1	59.9	56.4	62.6	71.7	65.4	98.4
10	(10,50)	2	5	56.2	50.4	57.6	54.0	60.7	71.3	64.0	97.2
10	(10,50)	2	10	71.5	60.6	72.3	62.3	74.2	67.1	76.2	73.7
10	(10,50)	3	5	66.0	57.4	67.1	59.2	69.4	63.9	71.9	70.7
10	(10,50)	3	10	85.2	69.8	85.9	71.0	87.5	73.9	89.0	77.8
20	(5,25)	1	5	46.1	44.9	48.2	50.2	54.0	72.1	62.1	98.7
20	(5,25)	1	10	55.2	49.0	56.3	53.1	59.0	71.1	62.4	97.8
20	(5,25)	2	5	51.5	46.9	52.8	51.4	55.8	70.0	59.4	96.7
20	(5,25)	2	10	61.4	53.5	62.2	55.4	63.9	60.7	66.1	69.1
20	(5,25)	3	5	58.1	51.5	59.1	53.7	61.6	59.3	64.2	67.9
20	(5,25)	3	10	69.5	59.1	70.2	60.4	71.5	64.1	73.1	68.5
20	(10,50)	1	5	75.3	75.4	79.5	86.1	89.7	129.7	104.5	179.4
20	(10,50)	1	10	84.6	80.6	87.1	89.7	92.1	129.9	97.7	179.3
20	(10,50)	2	5	82.5	77.9	84.7	87.9	90.4	127.9	97.1	176.8
20	(10,50)	2	10	97.1	87.2	98.3	90.8	101.4	100.9	104.5	117.2
20	(10,50)	3	5	90.8	84.3	92.6	88.1	96.9	97.7	100.9	113.3
20	(10,50)	3	10	111.1	95.9	112.2	98.1	114.5	103.4	117.1	111.5

Table A4: Total processing time [hours] when applying A_2 with the S-shape strategy

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	23.7	21.1	24.1	21.3	24.9	21.7	26.0	22.3
3	(5,25)	1	10	33.5	25.8	33.8	26.0	34.5	26.4	35.2	26.9
3	(5,25)	2	5	30.2	23.2	30.5	23.4	31.3	24.0	32.0	24.7
3	(5,25)	2	10	40.1	31.3	40.4	31.6	41.0	32.3	41.7	33.1
3	(5,25)	3	5	36.6	29.3	36.9	29.6	37.6	30.2	38.2	30.8
3	(5,25)	3	10	48.3	37.4	48.4	37.6	48.9	38.2	49.4	38.8
3	(10,50)	1	5	29.4	27.3	30.0	27.6	31.3	28.3	33.6	29.0
3	(10,50)	1	10	41.3	34.2	41.6	34.5	42.3	35.0	43.1	35.5
3	(10,50)	2	5	38.9	31.4	39.3	31.8	40.4	32.8	41.4	33.9
3	(10,50)	2	10	54.7	42.5	55.0	42.9	55.8	44.0	56.8	45.1
3	(10,50)	3	5	48.5	39.8	49.0	40.2	49.8	41.1	50.9	42.0
3	(10,50)	3	10	68.1	52.0	68.4	52.3	69.1	53.0	69.9	53.7
10	(5,25)	1	5	32.6	29.7	33.4	30.2	35.3	31.3	37.5	32.6
10	(5,25)	1	10	42.1	34.5	42.7	34.9	43.9	35.8	45.2	36.9
10	(5,25)	2	5	38.6	31.8	39.2	32.4	40.5	33.5	41.8	34.9
10	(5,25)	2	10	48.6	39.9	49.0	40.5	49.9	41.8	51.0	43.4
10	(5,25)	3	5	45.4	37.7	45.8	38.2	46.9	39.3	48.0	40.6
10	(5,25)	3	10	57.0	45.6	57.3	46.1	58.0	47.1	58.7	48.2
10	(10,50)	1	5	46.8	44.6	48.3	45.5	51.7	47.5	55.8	49.5
10	(10,50)	1	10	58.6	51.4	59.4	52.1	61.3	53.5	63.1	55.0
10	(10,50)	2	5	56.0	48.7	56.9	49.6	59.2	51.8	61.6	54.1
10	(10,50)	2	10	71.4	60.2	72.1	61.4	73.6	63.8	75.2	66.8
10	(10,50)	3	5	65.8	56.5	66.7	57.2	68.6	58.9	70.5	60.8
10	(10,50)	3	10	85.1	69.3	85.8	69.9	87.0	71.4	88.2	72.9
20	(5,25)	1	5	45.7	43.0	47.2	44.0	50.6	46.4	54.5	48.8
20	(5,25)	1	10	55.1	47.2	56.1	48.0	58.2	49.9	60.4	52.2
20	(5,25)	2	5	51.3	44.9	52.2	46.0	54.3	48.1	56.4	50.9
20	(5,25)	2	10	61.3	52.8	61.9	54.0	63.4	56.6	65.0	59.6
20	(5,25)	3	5	57.9	50.6	58.7	51.4	60.4	53.5	62.1	55.8
20	(5,25)	3	10	69.4	58.7	69.9	59.5	70.9	61.5	72.0	63.4
20	(10,50)	1	5	74.1	70.8	76.9	73.3	83.3	76.9	91.1	80.7
20	(10,50)	1	10	84.1	76.7	86.0	78.1	89.5	81.4	93.2	84.9
20	(10,50)	2	5	82.0	74.0	83.9	76.2	88.2	80.2	92.6	84.8
20	(10,50)	2	10	97.0	86.1	98.1	88.3	100.6	93.1	103.3	98.7
20	(10,50)	3	5	90.6	82.5	92.0	83.9	95.1	87.0	98.1	90.6
20	(10,50)	3	10	111.0	94.8	112.0	95.9	114.0	98.6	116.2	101.4

Table A5: Total processing time [hours] when applying A_1 with the LKH heuristic

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	22.1	20.0	22.9	20.9	24.9	23.5	27.4	29.1
3	(5,25)	1	10	29.4	23.7	29.8	24.4	30.9	26.4	32.1	30.4
3	(5,25)	2	5	27.0	21.8	27.6	22.6	28.9	25.0	30.3	29.7
3	(5,25)	2	10	34.1	28.0	34.4	28.6	35.1	29.9	35.8	31.7
3	(5,25)	3	5	31.1	26.6	31.5	27.3	32.6	28.8	33.8	31.0
3	(5,25)	3	10	38.2	31.9	38.4	32.3	39.0	33.3	39.6	34.7
3	(10,50)	1	5	28.5	26.7	29.8	28.1	32.9	32.8	37.1	43.0
3	(10,50)	1	10	38.6	32.1	39.5	33.4	41.4	36.6	43.5	43.6
3	(10,50)	2	5	35.7	29.8	36.6	31.0	38.7	34.6	41.1	42.9
3	(10,50)	2	10	47.4	38.2	47.9	39.0	49.1	41.1	50.4	43.8
3	(10,50)	3	5	41.5	35.8	42.2	36.7	43.8	39.1	45.6	42.0
3	(10,50)	3	10	53.2	43.8	53.7	44.4	54.5	46.0	55.6	48.0
10	(5,25)	1	5	31.2	29.3	32.9	31.6	36.7	41.0	41.7	55.4
10	(5,25)	1	10	38.0	33.0	38.8	35.0	40.6	42.6	42.7	56.9
10	(5,25)	2	5	35.5	31.1	36.4	33.2	38.4	41.4	40.9	55.9
10	(5,25)	2	10	42.6	36.8	43.1	38.0	44.1	40.9	45.3	45.0
10	(5,25)	3	5	39.7	35.4	40.4	36.6	42.0	40.0	43.8	44.4
10	(5,25)	3	10	46.9	40.3	47.2	41.1	48.0	43.2	48.8	45.6
10	(10,50)	1	5	46.4	45.5	49.4	50.4	56.4	70.2	65.5	97.6
10	(10,50)	1	10	56.0	50.7	57.7	54.7	61.4	71.1	65.4	98.1
10	(10,50)	2	5	53.0	48.3	54.7	52.3	58.5	70.6	62.9	97.2
10	(10,50)	2	10	64.2	56.5	65.1	58.5	67.1	64.3	69.3	71.6
10	(10,50)	3	5	58.9	53.4	60.2	55.6	63.0	61.8	65.9	70.1
10	(10,50)	3	10	70.4	61.3	71.1	62.9	72.5	66.5	74.0	70.9
20	(5,25)	1	5	44.7	43.8	47.6	49.5	54.5	71.1	63.1	98.6
20	(5,25)	1	10	51.1	46.9	52.5	51.6	55.5	70.6	59.1	97.2
20	(5,25)	2	5	48.3	45.3	49.8	50.2	53.1	70.2	57.0	96.5
20	(5,25)	2	10	55.4	50.2	56.1	52.5	57.8	58.4	59.6	66.8
20	(5,25)	3	5	52.4	48.8	53.5	51.1	55.9	57.6	58.5	65.8
20	(5,25)	3	10	59.3	53.6	59.9	55.1	61.0	58.6	62.2	63.1
20	(10,50)	1	5	74.3	74.5	80.0	86.1	93.9	128.8	109.6	178.3
20	(10,50)	1	10	81.7	78.5	84.6	88.3	90.7	130.0	98.3	178.4
20	(10,50)	2	5	79.3	75.8	82.1	86.5	89.0	126.6	96.4	175.6
20	(10,50)	2	10	89.6	83.4	91.1	88.0	94.5	99.5	98.1	116.0
20	(10,50)	3	5	83.7	80.6	85.8	85.3	90.2	97.5	95.2	114.7
20	(10,50)	3	10	96.1	87.4	97.1	90.1	99.4	97.0	101.9	106.5

Table A6: Total processing time [hours] when applying A_2 with the LKH heuristic

α	(n_l, n_u)	b	m	$k=2$		$k=3$		$k=5$		$k=7$	
				$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$	$a=r$	$a=c$
3	(5,25)	1	5	21.9	19.5	22.5	19.8	23.7	20.2	24.9	20.7
3	(5,25)	1	10	29.2	23.3	29.5	23.4	30.1	23.8	30.8	24.2
3	(5,25)	2	5	26.9	21.4	27.3	21.6	28.1	22.0	29.0	22.5
3	(5,25)	2	10	34.0	27.9	34.2	28.3	34.6	29.2	35.1	30.0
3	(5,25)	3	5	31.0	26.5	31.3	27.0	32.1	27.9	32.8	29.1
3	(5,25)	3	10	38.1	31.8	38.3	32.1	38.6	32.8	39.0	33.4
3	(10,50)	1	5	28.3	25.9	29.3	26.3	31.3	27.1	33.8	28.1
3	(10,50)	1	10	38.5	31.5	39.0	31.8	40.2	32.4	41.5	33.1
3	(10,50)	2	5	35.5	29.1	36.2	29.4	37.7	30.1	39.2	31.0
3	(10,50)	2	10	47.2	38.1	47.6	38.8	48.4	40.1	49.3	41.6
3	(10,50)	3	5	41.4	35.7	41.9	36.6	43.0	38.1	44.2	39.8
3	(10,50)	3	10	53.1	43.7	53.4	44.3	54.1	45.3	54.7	46.6
10	(5,25)	1	5	30.9	28.2	32.0	28.7	34.4	29.8	36.9	31.0
10	(5,25)	1	10	37.8	31.9	38.3	32.3	39.4	33.3	40.7	34.2
10	(5,25)	2	5	35.3	30.0	36.0	30.4	37.4	31.3	38.9	32.3
10	(5,25)	2	10	42.5	36.7	42.8	37.4	43.6	39.2	44.2	41.2
10	(5,25)	3	5	39.6	35.2	40.1	36.1	41.3	38.2	42.4	40.3
10	(5,25)	3	10	46.8	40.2	47.0	40.7	47.6	42.1	48.1	43.4
10	(10,50)	1	5	45.9	43.1	48.2	44.0	52.9	46.3	58.4	48.5
10	(10,50)	1	10	55.7	48.6	56.6	49.3	59.0	50.9	61.5	52.7
10	(10,50)	2	5	52.7	46.2	54.0	47.0	56.8	48.5	59.7	50.5
10	(10,50)	2	10	63.9	56.3	64.6	57.8	65.9	61.6	67.4	65.4
10	(10,50)	3	5	58.7	53.1	59.8	54.8	61.7	59.0	63.6	63.1
10	(10,50)	3	10	70.2	61.2	70.7	62.5	71.6	65.1	72.8	67.7
20	(5,25)	1	5	44.3	41.2	46.2	42.2	50.5	44.6	55.3	47.2
20	(5,25)	1	10	50.7	44.6	51.7	45.4	53.6	47.2	55.5	49.4
20	(5,25)	2	5	48.1	43.0	49.1	43.8	51.4	45.9	54.0	48.2
20	(5,25)	2	10	55.2	49.9	55.8	51.4	56.9	54.8	58.2	59.0
20	(5,25)	3	5	52.3	48.4	53.2	50.1	54.8	53.9	56.7	58.2
20	(5,25)	3	10	59.2	53.4	59.7	54.4	60.6	56.8	61.4	59.3
20	(10,50)	1	5	73.6	69.2	77.9	71.3	87.1	75.3	97.2	80.4
20	(10,50)	1	10	81.1	73.9	83.1	75.4	87.1	78.8	91.6	82.6
20	(10,50)	2	5	78.9	71.2	81.2	73.0	85.8	76.6	91.0	80.3
20	(10,50)	2	10	89.3	82.9	90.4	86.3	92.6	94.2	95.0	102.1
20	(10,50)	3	5	83.5	80.3	85.0	83.8	88.3	91.9	91.7	100.7
20	(10,50)	3	10	95.9	87.1	96.6	89.6	98.2	94.5	100.0	99.9

Table A8: Evaluation of the truncated brach-and-bound algorithm for problem classes with 100 customer orders and LKH heuristic

<i>a</i>	α	<i>b</i>	<i>m</i>	<i>k</i> = 3						<i>k</i> = 5						<i>k</i> = 7						<i>k</i> = 10																					
				<i>w</i> ₁	<i>w</i> ₂	<i>w_B</i>	<i>imp</i> ₁	<i>imp</i> ₂	<i>w</i> ₁	<i>w</i> ₂	<i>w_B</i>	<i>imp</i> ₁	<i>imp</i> ₂	<i>w</i> ₁	<i>w</i> ₂	<i>w_B</i>	<i>imp</i> ₁	<i>imp</i> ₂	<i>w</i> ₁	<i>w</i> ₂	<i>w_B</i>	<i>imp</i> ₁	<i>imp</i> ₂	<i>w</i> ₁	<i>w</i> ₂	<i>w_B</i>	<i>imp</i> ₁	<i>imp</i> ₂															
<i>r</i>	10	1	5	5.6	4.4	2.4	57.5	45.4	12.6	9.1	5.6	55.6	38.5	21.7	14.6	8.2	62.2	43.7	36.3	22.7	11.6	68.1	48.9	10.6	8.5	4.5	57.2	46.4	24.5	17.8	10.5	57.3	41.4	40.2	27.9	16.2	59.7	41.9	66.3	43.4	21.7	67.3	50.0
<i>r</i>	10	1	10	3.1	2.1	1.1	64.1	45.9	6.8	4.4	2.5	62.8	42.6	10.8	6.9	3.9	63.6	43.1	18.0	10.6	6.4	64.4	39.8	10.6	8.5	4.5	61.1	46.3	11.5	8.0	4.5	61.1	43.8	19.0	12.4	7.3	61.7	41.0	31.4	19.2	11.1	64.6	42.1
<i>r</i>	10	2	5	3.2	2.6	1.3	60.6	50.2	7.0	5.3	2.9	58.9	45.6	11.5	8.3	4.7	59.4	43.7	18.8	12.8	7.2	61.4	43.5	10.6	8.5	4.5	58.4	43.8	12.5	9.2	5.2	58.4	43.8	19.9	14.6	8.4	57.6	42.4	32.5	22.6	12.8	60.5	43.2
<i>r</i>	10	2	10	1.8	1.3	0.7	62.4	48.5	3.9	2.6	1.4	63.3	45.6	6.0	4.1	2.2	63.3	45.4	9.6	6.1	3.4	64.3	43.9	10.6	8.5	4.5	62.5	48.9	6.3	4.4	2.3	62.7	46.1	9.8	6.7	3.6	63.1	46.0	15.3	10.2	5.8	62.2	43.3
<i>r</i>	20	1	5	10.6	8.5	4.5	57.2	46.4	24.5	17.8	10.5	57.3	41.4	40.2	27.9	16.2	59.7	41.9	66.3	43.4	21.7	67.3	50.0	10.6	8.5	4.5	57.2	46.4	24.5	17.8	10.5	57.3	41.4	40.2	27.9	16.2	59.7	41.9	66.3	43.4	21.7	67.3	50.0
<i>r</i>	20	1	10	5.3	3.9	2.1	61.1	46.3	11.5	8.0	4.5	61.1	43.8	19.0	12.4	7.3	61.7	41.0	31.4	19.2	11.1	64.6	42.1	10.6	8.5	4.5	61.1	46.3	11.5	8.0	4.5	61.1	43.8	19.0	12.4	7.3	61.7	41.0	31.4	19.2	11.1	64.6	42.1
<i>r</i>	20	2	5	5.6	4.6	2.4	57.6	48.9	12.5	9.2	5.2	58.4	43.8	19.9	14.6	8.4	57.6	42.4	32.5	22.6	12.8	60.5	43.2	10.6	8.5	4.5	58.4	43.8	12.5	9.2	5.2	58.4	43.8	19.9	14.6	8.4	57.6	42.4	32.5	22.6	12.8	60.5	43.2
<i>r</i>	20	2	10	2.9	2.1	1.1	62.5	48.9	6.3	4.4	2.3	62.7	46.1	9.8	6.7	3.6	63.1	46.0	15.3	10.2	5.8	62.2	43.3	10.6	8.5	4.5	62.5	48.9	6.3	4.4	2.3	62.7	46.1	9.8	6.7	3.6	63.1	46.0	15.3	10.2	5.8	62.2	43.3
average				4.8	3.7	1.9	60.4	47.6	10.6	7.6	4.4	60.0	43.4	17.4	11.9	6.8	61.3	43.4	28.5	18.5	10.0	64.1	44.3	10.6	8.5	4.5	60.4	47.6	10.6	7.6	4.4	60.0	43.4	17.4	11.9	6.8	61.3	43.4	28.5	18.5	10.0	64.1	44.3
<i>c</i>	10	1	5	8.2	1.8	1.0	88.0	46.3	28.0	4.1	2.4	91.4	40.5	55.4	6.3	4.1	92.6	35.3	94.1	10.7	6.4	93.2	40.4	10.6	8.5	4.5	88.0	46.3	28.0	4.1	2.4	91.4	40.5	55.4	6.3	4.1	92.6	35.3	94.1	10.7	6.4	93.2	40.4
<i>c</i>	10	1	10	6.8	1.5	0.7	89.1	49.3	23.2	3.0	1.9	91.8	36.9	50.2	4.8	3.1	93.9	36.4	89.8	8.0	5.1	94.3	36.1	10.6	8.5	4.5	89.1	49.3	23.2	3.0	1.9	91.8	36.9	50.2	4.8	3.1	93.9	36.4	89.8	8.0	5.1	94.3	36.1
<i>c</i>	10	2	5	7.0	1.6	0.8	87.9	47.7	25.2	3.2	1.9	92.5	40.3	51.9	5.2	3.4	93.4	33.9	90.7	8.5	5.4	94.0	36.1	10.6	8.5	4.5	87.9	47.7	25.2	3.2	1.9	92.5	40.3	51.9	5.2	3.4	93.4	33.9	90.7	8.5	5.4	94.0	36.1
<i>c</i>	10	2	10	3.9	3.1	1.6	58.9	49.0	9.6	7.0	4.0	58.3	42.3	16.9	10.7	6.5	61.3	38.7	33.1	18.2	9.4	71.7	48.7	10.6	8.5	4.5	58.9	49.0	9.6	7.0	4.0	58.3	42.3	16.9	10.7	6.5	61.3	38.7	33.1	18.2	9.4	71.7	48.7
<i>c</i>	20	1	5	18.8	3.9	2.1	88.7	46.2	61.5	8.0	5.0	91.9	37.5	111.0	13.1	8.3	92.5	36.5	182.3	21.1	12.6	93.1	40.5	10.6	8.5	4.5	88.7	46.2	61.5	8.0	5.0	91.9	37.5	111.0	13.1	8.3	92.5	36.5	182.3	21.1	12.6	93.1	40.5
<i>c</i>	20	1	10	15.9	3.0	1.6	90.1	47.8	57.6	6.4	3.8	93.3	39.8	105.9	10.1	6.5	93.8	35.7	179.4	16.4	10.2	94.3	38.0	10.6	8.5	4.5	90.1	47.8	57.6	6.4	3.8	93.3	39.8	105.9	10.1	6.5	93.8	35.7	179.4	16.4	10.2	94.3	38.0
<i>c</i>	20	2	5	16.8	3.3	1.7	89.9	48.2	56.9	6.9	3.9	93.1	42.8	105.9	10.5	6.6	93.8	37.4	177.0	17.1	10.8	93.9	36.5	10.6	8.5	4.5	89.9	48.2	56.9	6.9	3.9	93.1	42.8	105.9	10.5	6.6	93.8	37.4	177.0	17.1	10.8	93.9	36.5
<i>c</i>	20	2	10	8.2	6.5	3.3	60.0	49.4	19.7	14.2	8.5	56.9	40.3	36.1	22.2	13.1	63.8	41.0	67.9	36.1	17.5	74.1	51.4	10.6	8.5	4.5	60.0	49.4	19.7	14.2	8.5	56.9	40.3	36.1	22.2	13.1	63.8	41.0	67.9	36.1	17.5	74.1	51.4
average				10.7	3.1	1.6	81.6	48.0	35.2	6.6	3.9	83.6	40.1	66.7	10.4	6.5	85.6	36.9	114.3	17.0	9.7	88.6	41.0	10.6	8.5	4.5	81.6	48.0	35.2	6.6	3.9	83.6	40.1	66.7	10.4	6.5	85.6	36.9	114.3	17.0	9.7	88.6	41.0