Table 1: Average total running times (in s) and numbers of Bellman backups on each domain for each tested algorithms. The symbol '-' means that solving exceeded 5 min

MDP characteristics				VI		LRTDP		ILAO*		TVI		eTVI		eiTVI	
D	$\|S\|$ (k)	$\|K\|$	k_{max} (k)	B (M)	T_{tot} (s)	B (M)	T_{tot} (s)	B (M)	T_{tot} (s)	B (M)	T_{tot} (s)	B (M)	T_{tot} (s)	B (M)	T_{tot} (s)
Layered	100	10	10	5.46±0.703	0.777±0.102	1.39±0.129	0.595±0.056	6.46±1.03	3.85±0.619	1.43±0.0962	0.328±0.018	1.43±0.0962	0.298±0.012	0.552±0.0073	0.253±0.002
	200	10	20	15.7±2.54	2.42±0.389	3.41±0.384	1.76±0.185	19±3.96	12.7±2.68	3.53±0.301	0.964±0.067	3.53±0.301	0.74±0.042	1.14±0.0114	0.561±0.009
	300	10	30	27.1±5.86	4.37±0.947	5.61±0.83	3.19±0.475	36.4±6.88	25.9±4.96	5.88±0.762	1.74±0.183	5.88±0.762	1.25±0.107	1.73±0.0218	0.886±0.005
	400	10	40	39.6±5.87	6.57±0.972	8.78±1.55	5.35±0.974	47±11.5	35±8.6	8.18±0.701	2.54±0.193	8.18±0.701	1.78±0.097	2.32±0.0432	1.24±0.009
	500	10	50	49.8±9.06	8.33±1.51	10.3±1.13	6.54±0.736	71±7.82	53.7±6.05	10.4±1.17	3.33±0.327	10.4±1.17	2.31±0.17	2.89±0.0418	1.62±0.014
	600	10	60	67.3±12.9	11.4±2.21	13.4±1.73	8.66±1.09	106±24.9	82±19.3	13.3±1.55	4.38±0.44	13.3±1.55	2.97±0.221	3.52±0.0648	2.08±0.073
	700	10	70	66.7±15.7	11.5±2.73	14.7±1.88	9.87±1.28	133±21.5	106±17.1	14.1±1.87	4.89±0.544	14.1±1.87	3.36±0.276	4.09±0.0362	2.47±0.028
	800	10	80	93.7±21.5	16.4±3.81	18.6±3.89	12.9±2.76	-	-	18.4±2.57	6.42±0.768	18.4±2.57	4.27±0.381	4.68±0.0385	2.92±0.029
	900	10	90	89±14	15.7±2.51	19.8±2.1	13.9±1.46	-		18.6±1.69	6.8±0.523	18.6±1.69	4.63±0.277	5.29±0.0891	3.44±0.023
	1000	10	100	96.7±19.9	17.7±3.64	23.7±4.42	17±3.08	-		20.4±2.31	7.74±0.711	20.4±2.31	5.19±0.358	5.89±0.0825	3.9±0.029
Layered	1000	1	1000	201±36.6	39.3±7.24	-	-	-	-	197±36.2	98.8±17.9	197±36.2	37.7±6.39	191±33.4	37.3±6.02
	1000	2	500	143±24.3	29.3±5.53	88±9.32	76.9±7.62	87.6±17.4	91.8±19.3	83.2±12.7	33.9±4.77	83.2±12.7	17±2.24	82±12.2	17.7±2.16
	1000	4	250	132±22.5	25.4±4.62	48.4±5.18	38.1±4.28	179±26.4	167±25.9	46.2±5.98	17.4±2.02	46.2±5.98	9.94±1.01	39.3±9.68	9.86±1.65
	1000	8	125	112±24.7	21±4.43	27±2.84	19.6±2.18	221±35.8	197±41	25.8±3.64	9.54±1.11	25.8±3.64	6.13±0.583	6.16±0.104	4.01±0.05
	1000	16	62.5	100±18.7	18.1±3.37	15.5±2.52	10.6±1.87	178±43.2	141±34.6	15.9±1.45	5.87±0.415	15.9±1.45	4.24±0.213	5.5±0.0463	3.79±0.048
	1000	32	31.3	84.6±18.2	14.9±3.12	10.7±1.74	7.08±1.18	185±30.2	140±23.5	9.52±0.794	3.67±0.198	9.52±0.794	3.22±0.11	4.17±0.0301	3.64±0.047
	1000	64	15.63	82.2±15.4	14.4±2.66	7.97±1.72	5.39±1.16	165±27.8	121±20.7	5.06±0.357	2.44±0.082	5.06±0.357	2.59±0.071	2.3±0.0206	3.47±0.051
	1000	128	7.81	69.7±11.9	12.1±2.06	15.5±2.58	8.26±1.35	130±20.9	96.1±15.6	31.1±5.38	9.04±1.33	31.1±5.38	6.77±0.876	2.81±0.155	3.37±0.046
	1000	256	3.91	43.9±7.39	7.61±1.27	6.08±1.08	3.38±0.655	91.4±22.8	66.2±17	10±1.69	3.69±0.384	10±1.69	3.43±0.262	1.44±0.0316	3.45±0.122
	1000	512	1.96	34.7±4.48	5.99±0.778	3.43±0.67	2.14±0.397	79.8±13.9	57.6±10.2	4.33±0.642	2.39±0.129	4.33±0.642	2.57±0.103	0.782±0.0249	3.39±0.036
	1000	1024	0.98	41.8±7.58	7.28±1.31	3.65±0.575	2.31±0.341	88.6±13.9	64.3±10.1	6.13±1.2	2.8±0.243	6.13±1.2	2.85±0.161	0.878±0.0315	3.42±0.031
	1000	2048	0.49	33.3±3.2	5.78±0.551	3.02±0.524	2.02±0.336	78.5±12.8	57±9.63	3.37±0.369	2.21±0.076	3.37±0.369	2.42±0.063	0.602±0.0155	3.42±0.092
	1000	4096	0.25	29.3±2.68	5.06±0.464	2.43±0.423	1.67±0.257	68.9±15	49.5±10.9	2.48±0.212	2.02±0.06	2.48±0.212	2.28±0.058	0.54±0.0391	3.36±0.042
	1000	8192	0.12	34.7±3.21	6.02±0.57	3.51±2	2.42±1.29	77.6±17.9	56±13.2	2.77±0.274	2.09±0.054	2.77±0.274	2.35±0.047	0.474±0.0139	3.41±0.064
	1000	16384	0.06	34.6±4.9	5.97±0.866	2.77±0.617	1.96±0.418	85.6±19	62.1±14.3	2.57±0.387	2.04±0.104	2.57±0.387	2.32±0.08	0.447±0.0137	3.39±0.067
SAP	10	1	10	3.12	0.032±0	4.13±0.109	0.165±0.004	0.484	0.016	1.04	0.012	1.04	0.011±0	0.81	0.009±0
	40	1	40	22.2	0.232±0.001	86.6±1.58	3.43±0.059	4.42	0.159±0.001	9.08	0.105±0.001	9.08	0.098±0	5.6	0.065±0
	90	1	90	71.6	0.822±0.001	258±9.6	10.8±0.394	12.8	0.57±0.001	32.2	0.438±0.002	32.2	0.375±0.001	18.6	0.23±0.001
	160	1	160	155	1.81±0.002	1220±21.6	57.8±1.2	35.8	1.91±0.003	88.2	1.39±0.004	88.2	1.04±0.002	42.7	0.526±0.001
	250	1	250	314	3.75±0.003	3820±153	207±8.92	66.8	3.98±0.006	165	2.81±0.008	165	1.94±0.001	95.2	1.15±0.001
	360	1	360	482	5.72±0.006	-	-	107	6.58±0.013	250	4.24±0.004	250	2.92±0.001	160	1.92±0.001
	490	1	490	764	9.17±0.013	-	-	166	10.5±0.02	377	6.5±0.012	377	4.48±0.008	241	2.92±0.004
	640	1	640	1110	13.3±0.014	-	-	241	15.7±0.033	600	10.4±0.011	600	7.14±0.006	339	4.12±0.006
	810	1	810	1510	18±0.019	-	-	380	25.8±0.056	813	13.8±0.024	813	9.56±0.01	549	6.56±0.01
	1000	1	1000	1850	21.9±0.019	-	-	467	33±0.131	1020	16.9±0.031	1020	12.1±0.028	718	8.63±0.019
Wetfloor	500	1	500	433±61.9	9.76±1.39	19.1±10.4	11.9±4	73.4±28.6	11.9±4.85	413±27.8	18.4±1.26	413±27.8	9.48±0.63	180±13.8	4.22±0.313
	500	2	250	459±84.2	10.4±1.9	90±64.2	16.1±5.87	72.3±37	11.2±5.99	372±16.4	15.9±0.698	372±16.4	8.49±0.382	161±15	3.76±0.339
	500	3	166	601±72.8	13.5±1.64	13.3±12.3	12.6±2.69	83.2±24.9	12.8±3.85	336±16.7	14.1±0.718	336±16.7	7.64±0.374	160±11.6	3.74±0.257
	500	4	125	706±77.5	15.9±1.74	43.3±40.8	19.1±4.78	117±37.7	18.1±6.09	314±11.3	13±0.48	314±11.3	7.13±0.252	157±13.6	3.67±0.307
	500	5	100	732±61.4	16.5±1.39	18.4±15.6	16.7±3.2	125±26.7	19.2±4.18	303±12	12.4±0.489	303±12	6.88±0.271	157±11.3	3.64±0.253
	500	6	83.5	875±67.3	19.7±1.51	6.2±3.81	20.9±4.71	135±50.8	21±7.96	304±15.7	12.2±0.628	304±15.7	6.88±0.336	171±14.5	3.96±0.32
	500	7	71.3	957±45.5	21.5±1.03	24.2±28.7	24.5±5.76	169±40.7	25.6±6.33	289±12	11.4±0.469	289±12	6.55±0.253	166±10.9	3.84±0.241
	500	8	62.5	959±68.7	21.6±1.53	16.4±10	22.3±3.72	174±37.9	26.5±5.86	289±12.9	11±0.495	289±12.9	6.52±0.279	166±12.7	3.83±0.281
	500	9	55.7	1070±77.5	24±1.74	4.22±1.61	25.4±5.07	220±51.1	33.4±7.9	299±18.3	10.9±0.692	299±18.3	6.68±0.399	181±17.4	4.13±0.385
	500	10	50.2	1200±67.2	27±1.5	6.99±3.17	31.7±4.16	289±36.3	43.9±5.48	316±12.8	10.8±0.453	316±12.8	6.99±0.279	201±11.8	4.52±0.257

Table 2: Average running times of Tarjan, Relabeling (T_r) and VI sweeps (T_s) (in s) and numbers of Bellman backups on each domain for the TVI, eTVI and eiTVI algorithms.

	MDP characteristics			Tarjan	TVI		eTVI			eiTVI		
D	$\|S\|$ (k)	$\|K\|$ (k)	$\|k_{max}\|$ (k)	(s)	T_s (s)	B (M)	T_r (s)	T_s (s)	B (M)	T_r (s)	T_s (s)	B (M)
Layered	100	10	10	0.049±0.001	0.276±0.018	1.43±0.0962	0.052±0.001	0.194±0.013	1.43±0.0962	0.125±0.001	0.077±0.001	0.552±0.0073
	200	10	20	0.115±0.001	0.844±0.068	3.53±0.301	0.111±0.001	0.509±0.041	3.53±0.301	0.266±0.006	0.172±0.002	1.14±0.0114
	300	10	30	0.196±0.007	1.53±0.183	5.88±0.762	0.176±0.002	0.87±0.106	5.88±0.762	0.410±0.004	0.273±0.003	1.73±0.0218
	400	10	40	0.288±0.004	2.24±0.192	8.18±0.701	0.246±0.002	1.23±0.097	8.18±0.701	0.559±0.005	0.376±0.007	2.32±0.0432
	500	10	50	0.391±0.002	2.92±0.327	10.4±1.17	0.320±0.002	1.59±0.168	10.4±1.17	0.739±0.007	0.479±0.009	2.89±0.0418
	600	10	60	0.509±0.002	3.85±0.44	13.3±1.55	0.399±0.002	2.04±0.219	13.3±1.55	0.945±0.040	0.592±0.015	3.52±0.0648
	700	10	70	0.632±0.006	4.25±0.544	14.1±1.87	0.483±0.006	2.22±0.274	14.1±1.87	1.129±0.019	0.689±0.009	4.09±0.0362
	800	10	80	0.760±0.007	5.64±0.768	18.4±2.57	0.562±0.004	2.92±0.381	18.4±2.57	1.335±0.013	0.804±0.013	4.68±0.0385
	900	10	90	0.887±0.006	5.89±0.522	18.6±1.69	0.652±0.009	3.06±0.267	18.6±1.69	1.602±0.013	0.923±0.019	5.29±0.0891
	1000	10	100	1.026±0.008	6.69±0.711	20.4±2.31	0.736±0.006	3.41±0.356	20.4±2.31	1.811±0.013	1.05±0.021	5.89±0.0825
Layered	1000	1	1000	1.309±0.010	97.5±17.9	197±36.2	0.919±0.004	35.5±6.39	197±36.2	1.537±0.006	34.5±6.02	191±33.4
	1000	2	500	1.332±0.003	32.5±4.77	83.2±12.7	0.853±0.006	14.7±2.24	83.2±12.7	1.759±0.024	14.6±2.15	82±12.2
	1000	4	250	1.201±0.005	16.1±2.01	46.2±5.98	0.786±0.007	7.93±1.01	46.2±5.98	1.819±0.024	6.81±1.65	39.3±9.68
	1000	8	125	1.062±0.016	8.46±1.12	25.8±3.64	0.750±0.005	4.3±0.583	25.8±3.64	1.824±0.010	1.11±0.042	6.16±0.104
	1000	16	62.5	0.955±0.004	4.89±0.416	15.9±1.45	0.716±0.003	2.54±0.212	15.9±1.45	1.835±0.024	0.965±0.023	5.5±0.0463
	1000	32	31.3	0.899±0.010	2.7±0.201	9.52±0.794	0.691±0.005	1.56±0.113	9.52±0.794	1.906±0.035	0.756±0.023	4.17±0.0301
	1000	64	15.63	0.836±0.013	1.4±0.079	5.06±0.357	0.687±0.011	0.875±0.059	5.06±0.357	1.963±0.021	0.485±0.028	2.3±0.0206
	1000	128	7.81	0.773±0.010	8.04±1.33	31.1±5.38	0.675±0.006	5.11±0.875	31.1±5.38	1.822±0.013	0.58±0.036	2.81±0.155
	1000	256	3.91	0.831±0.007	2.57±0.38	10±1.69	0.670±0.006	1.67±0.256	10±1.69	1.955±0.073	0.37±0.029	1.44±0.0316
	1000	512	1.96	0.821±0.012	1.25±0.129	4.33±0.642	0.680±0.007	0.763±0.098	4.33±0.642	2.015±0.021	0.254±0.018	0.782±0.0249
	1000	1024	0.98	0.837±0.012	1.64±0.245	6.13±1.2	0.691±0.005	1.02±0.169	6.13±1.2	2.001±0.021	0.286±0.021	0.878±0.0315
	1000	2048	0.49	0.823±0.010	1.05±0.072	3.37±0.369	0.684±0.006	0.606±0.056	3.37±0.369	2.048±0.057	0.233±0.016	0.602±0.0155
	1000	4096	0.25	0.818±0.019	0.867±0.044	2.48±0.212	0.682±0.011	0.476±0.035	2.48±0.212	2.025±0.016	0.211±0.008	0.54±0.0391
	1000	8192	0.12	0.826±0.015	0.92±0.053	2.77±0.274	0.686±0.006	0.529±0.041	2.77±0.274	2.045±0.035	0.207±0.01	0.474±0.0139
	1000	16384	0.06	0.824±0.022	0.879±0.081	2.57±0.387	0.684±0.011	0.497±0.058	2.57±0.387	2.037±0.025	0.204±0.011	0.447±0.0137
SAP	10	1	10	0.001	0.011	1.04	0.001	0.01	1.04	0.001	0.008	0.81
	40	1	40	0.002	0.102±0.001	9.08	0.002	0.092±0	9.08	0.005	0.057±0	5.6
	90	1	90	0.004	0.431±0.002	32.2	0.005	0.363±0.001	32.2	0.012	0.211±0.001	18.6
	160	1	160	0.008	1.37±0.004	88.2	0.009	1.01±0.002	88.2	0.022	0.491±0.001	42.7
	250	1	250	0.013	2.79±0.008	165	0.015	1.9±0.001	165	0.036	1.1±0.001	95.2
	360	1	360	0.018	4.21±0.004	250	0.021	2.87±0.001	250	0.054	1.83±0.001	160.0
	490	1	490	0.027	6.46±0.012	377	0.029	4.41±0.008	377	0.075	2.8±0.004	241.0
	640	1	640	0.037	10.3±0.011	600	0.038	7.04±0.006	600	0.100	3.97±0.005	339.0
	810	1	810	0.045	13.8±0.024	813	0.050	9.44±0.01	813	0.130	6.37±0.01	549.0
	1000	1	1000	0.055	16.8±0.031	1020	0.061	11.9±0.027	1020	0.162	8.39±0.019	718.0
Wetfloor	500	1	500	0.053	18.4±1.26	413±27.8	0.054	9.36±0.63	413±27.8	0.104±0.005	4.04±0.31	180±13.8
	500	2	250	0.051	15.8±0.698	372±16.4	0.053	8.37±0.382	372±16.4	0.097±0.003	3.6±0.337	161±15.0
	500	3	166	0.050	14.1±0.717	336±16.7	0.053	7.52±0.374	336±16.7	0.095±0.002	3.58±0.256	160±11.6
	500	4	125	0.049	13±0.48	314±11.3	0.053	7.02±0.252	314±11.3	0.097±0.002	3.51±0.305	157±13.6
	500	5	100	0.048	12.4±0.489	303±12	0.053	6.77±0.271	303±12	0.093±0.002	3.49±0.252	157±11.3
	500	6	83.5	0.048	12.2±0.627	304±15.7	0.053	6.77±0.336	304±15.7	0.094±0.001	3.81±0.319	171±14.5
	500	7	71.3	0.046	11.4±0.469	289±12	0.052	6.44±0.253	289±12	0.093±0.001	3.69±0.241	166±10.9
	500	8	62.5	0.046	10.9±0.495	289±12.9	0.053	6.4±0.279	289±12.9	0.092±0.002	3.68±0.28	166±12.7
	500	9	55.7	0.046	10.8±0.691	299±18.3	0.052	6.57±0.399	299±18.3	0.092±0.002	3.97±0.384	181±17.4
	500	10	50.2	0.046	10.7±0.453	316±12.8	0.052	6.88±0.279	316±12.8	0.093±0.001	4.36±0.256	201±11.8

Table 3: Cache metrics obtained with an Intel Core i5-7600k CPU on the Layered domain (instance with 1M states and 10 layers). Both the number of cache-refs and cache-misses decrease when we pass from TVI to eTVI as well as from eTVI to eiTVI. However, the percentage of cache-misses vs cache-refs decreases when we pass form TVI to eTVI, but increases when we pass from eTVI to eiTVI (because of the extra computation needed to perform the reversed BFS).

Solver	Cache-Refs	Cache-Misses	Percent (cache-miss/cache-ref)
TVI	2.87G	0.860G	29.96
eTVI	2.39G	0.413G	17.28
eiTVI	1.59G	0.328G	20.62

Table 4: Average speedup factors obtained on each tested domain.

Domain	TVI vs VI	eTVI vs TVI	eiTVI vs eTVI	eiTVI vs TVI
Layered (var. states)	2.4988	1.4306	1.3955	1.9965
Layered (var. layers)	1.8054	1.4549	0.9774	1.4220
SAP	1.3999	1.3725	1.7440	2.3937
Wetfloor	1.3810	1.7788	1.8635	3.3147
Average	1.6285	1.6018	1.3119	2.1014