Simulator Readme

Compilation

The simulator can be easily compiled by running `make` in the main project directory (asuming that the necesarry dependecies are met). The source code was compiled on Ubuntu 19.10 without any extra dependencies needed. Alternatively the program can be compiled by running `g++ simulator.cpp`.

CLI Arguments

The following list contain the command line arguments that the simulator supports at the moment.

- `./simulator -C <path/to/bench/file>`
- `./simulator -T <unit_of_time>`
- `./simulator -I <path/to/input/file>`
- `./simulator -S`
- `./simulator -G`
- `./simulator -B`

Their use case is explained in the following section

Example Usage

These are some examples using the command line arguments that the simulator supports.

`./simulator -C ISCAS/iscas89/s27.bench` runs the simulator on s27.bench

`./simulator -C ISCAS/iscas89/s27.bench -T s` runs the simulator on s27.bench and returns in std out the execution time in seconds

`./simulator -C ISCAS/iscas89/s27.bench -T ms` runs the simulator on s27.bench and returns in std out the execution time in miliseconds

`./simulator -C ISCAS/iscas89/s208.1.bench -I TESTS/iscas89/test\ suite\ 1/s208.vec` runs the simulator on *s27.bench* with input file *s208.vec*

`./simulator -C ISCAS/iscas89/s27.bench -G` runs the simulator on s27.bench and saves the netlist as a Graphviz file (only for small netlists)

`./simulator -C ISCAS/iscas89/s27.bench -S` runs the simulator on s27.bench and returns the netlist stats in standard out

`./simulator -C ISCAS/iscas89/s27.bench -B` runs the simulator on s27.bench with a progress bar for more verbose output (useful in larger circuits)

Scripts

The script *gen_table.sh* is used to run the simulator on all the inputs from *ISCAS89* and *ISCAS85* benchmark suits and save the execution time in ms as well as each netlist stats in a text file. Then a python script called *Results.py* is used to parse the file and generate a markdown table, the one shown in the PDF.

Netlist Statistics

Circuit	Time (ms)	Lines	# of Nand	# of And	#of Nor	# of Not	# of Buff	# of Inputs	# of Outputs	# Paths	Graph Size (KB)
c1355	22.574	619	416	56	0	40	32	41	32	4173216	81
c5315	126.514	2714	454	718	27	581	419	178	123	1341305	357
c6288	112.751	2480	0	256	2128	32	0	32	32	1101055638	328
c7552	223.137	3886	1028	776	54	876	593	207	108	726494	510

Circuit	Time (ms)	Lines	# of Nand	# of And	#of Nor	# of Not	# of Buff	# of Inputs	# of Outputs	# Paths	Graph Size (KB)
c17	0.094	13	6	0	0	0	0	5	2	11	1
c2670	40.036	1674	254	332	12	321	305	233	140	679954	218
c880	4.852	469	87	117	61	63	26	60	26	8642	61
c3540	51.495	1761	298	495	68	490	246	50	22	28265874	231
c1908	16.206	963	377	63	1	277	187	33	25	729056	126
s27	0.129	21	1	1	4	2	0	7	4	28	2
s420.1	1.972	269	29	49	34	78	0	34	17	474	35
s208.1	0.768	131	15	21	16	38	0	18	9	142	17
s344	1.282	201	18	44	30	59	0	24	17	344	26
s1196	7.873	593	119	118	50	141	0	32	32	3098	78
s349	1.313	202	19	44	31	57	0	24	17	354	26
s641	3.88	475	4	90	0	272	0	54	42	1722	61
s938	6.411	545	57	105	70	158	0	66	33	1714	71
s38584	6409.59	22447	2126	5516	1185	7805	0	1464	1730	1080723	2940
s713	4.403	489	28	94	0	254	0	54	42	21812	63
s1494	13.418	686	0	354	0	89	0	14	25	976	91
s1238	8.498	572	125	134	57	80	0	32	32	3559	75
s344.1	1.494	201	18	44	30	59	0	24	17	344	26
s1423	13.309	827	64	197	92	167	0	91	79	44726	108
s1512	16.462	926	92	98	47	367	0	86	60	3468	120
s991	7.582	623	101	47	33	220	0	84	20	7444	81
s820	4.636	336	54	76	66	33	0	23	24	492	45
s953	5.943	492	114	49	112	84	0	45	52	1156	64
s386	1.624	185	0	83	0	41	0	13	13	207	24
s510	2.276	249	61	34	55	32	0	25	13	369	32
s13207	1066.04	9441	849	1114	98	5378	0	700	790	1345369	1226
s1269	8.713	671	74	235	87	132	0	55	47	39570	88
s400	1.606	213	36	11	34	56	0	24	27	448	27
s298	1.095	156	9	31	19	44	0	17	20	231	20
s635	3.102	353	34	31	30	128	0	34	33	1245	46
s382	1.529	209	30	11	34	59	0	24	27	400	27
s9234	489.134	6094	528	955	113	3570	0	247	250	244854	793
s35932	5614.21	19876	7020	4032	0	3861	0	1763	2048	197141	2602

Circuit	Time (ms)	Lines	# of Nand	# of And	#of Nor	# of Not	# of Buff	# of Inputs	# of Outputs	# Paths	Graph Size (KB)
s967	5.816	491	102	49	107	99	0	45	52	1071	64
s499	1.656	197	60	0	20	32	0	23	22	1452	26
s444	1.963	232	58	13	34	62	0	24	27	535	30
s838.1	6.725	545	57	105	70	158	0	66	33	1714	71
s1196.1	9.032	593	119	118	50	141	0	32	32	3098	78
s832	4.45	334	54	78	66	25	0	23	24	506	44
s1488	13.412	692	0	350	0	103	0	14	25	962	92
s5378	148.818	3236	0	0	765	1775	15	214	228	13542	421
s526	2.147	244	22	56	35	52	0	24	27	410	32
s38417	8413.21	25585	2050	4154	2279	13470	0	1664	1742	1391579	3330
s15850	1526.33	11067	968	1619	151	6324	0	611	684	164738046	1439