For convenience I have marked every change with “// FIX”

I tried to minimize changes in existing code and keep logic the same.

1. No console output

My understanding of the task:

- **Simulator.exe** has to list all probes on console if no json output required.

- **Simulator.exe** has to generate only json if json output required.

The problem is:

`PrintProbes` generates console output only on tested gates. Probing gates happens only if json output requested.

2. Slow execution

There is a problem, function `Run` is slow:

- unoptimal code: there are many places with redundant copying/cloning objects/variables.

- the probing algorithm is “linear”. I did change the algorithm.

3. Slow JSON output

There few things that can be improved:

- trivial regexp is applied on most of layout, in fact has to be triggered once for each regexp.

- reduce amount << operations to file stream, inside write\_json function.

- parallelize property\_tree generation, in places it is possible.

- generating property\_tree as intermediate JSON storage is redundant, also the JSON structure is fixed. Probably property\_tree is not the best choice. I see few optimisations, the first is use another JSON library, the second generate JSON as string for every used classes, any of these will dramatically change the code.

4. Code improvements