**Computer Architectures**
**2nd part labs – lab 3**
**Processor configuration and performance checking in gem5**

1) Download, from the course site, the python configuration script called `mygem5script.py`
the script configures an Out-of-Order (O3) processor based on the *DerivO3CPU*, a superscalar processor, with a reduce number of features. Assuming that the pipeline stages in the processor are:
   - Fetch
   - Decode
   - Rename
   - Issue/Execute/WB
   - Commit

   the characteristics for the different pipeline stages as well as for the processor functional units are provided in the configuration script (`mygem5script.py`).
   - Change the gem5 path in the script:

2)
```
GEM5_DIR = /opt/gem5/
```

   a. Run the programs belonging to to the automotive sector available in MiBench: `basicmath, bitcount, qsort, and susan`, and collect the statistics for every one of them. In particular:
      - Number of instructions simulated
      - Number of instructions committed
      - Number of CPU Clock Cycles
      - CPI

   assuming that the configuration script is placed in the same folder the executable file is, run the processor simulation in the following way:

```
~/my_gem5Dir$ /opt/gem5/build/ALPHA/gem5.opt mygem5script.py -c hello
```

   b. Modify the processor configuration parameters in the configuration script (`mygem5script.py`) in order to improve the processor performance in every case.
   c. Report your best configuration and create a table comparing the new results against the previous ones.