Obtaining and Installing the NAS Parallel Benchmark

The NAS parallel benchmark is open-source and can be downloaded and built using the following commands. Ensure that `mpif90` and `scorep` commands are in your PATH variable:

1. `wget https://www.nas.nasa.gov/assets/npb/NPB3.3.1.tar.gz`
2. `tar -zxvf NPB3.3.1.tar.gz`
3. `cd NPB3.3.1/NPB3.3-MPI`
4. `cp config/make.def.template config/make.def`
5. In file `config/make.def` set the following variables:
    a. `MPIF77 = $(PREP) mpif90`
    b. `FFLAGS = -O2 -g`
6. To build for profiling with Scalasca, type:
    a. `PREP=scorep make bt NPROCS=9 CLASS=A SUBTYPE=full`
    b. This will create the executable binary `bin/bt.A.9.mpi_io_full`

The Scalasca trace files can be obtained from the USB stick or you can create them yourself using the instructions below. It is recommended that you create the trace files as part of learning on how to use the tools.

7. To run the example code under Scalasca, type:
    a. `scalasca -analyze mpirun -n 9 ./bt.A.9.mpi_io_full`
    b. After completing execution, it will create a trace directory `scorep_bt_9_sum/`
8. To view the profile in Scalasca, type:
    a. `scalasca -examine scorep_bt_9_sum`
9. To view the profile in text format, type:
    a. `scalasca -examine -s scorep_bt_9_sum`

10. The previous Scalasca command did a partial trace. To fully trace the application, following these instructions:
    a. Execute the command in step 8 a). In the text file `scorep_bt_9_sum/scorep.score` obtain the value listed in the "`Estimated memory requirements field`". From this value, set the environment variable `export SCOREP_TOTAL_MEMORY=<value>MB`
    b. `scalasca -analyze **-t** mpirun -n 9 ./bt.A.9.mpi_io_full`
    c. After completing execution, it will create a trace directory `scorep_bt_9_trace/`
    d. `scalasca -examine scorep_bt_9_trace`