TDT4200 Problem set 1 (Pass/fail evaluation)

Answers should be submitted by e-mail, to thorvan@idi.ntnu.no.

There is no final deadline for this problem set specifically, but answers for subsequent problems will not be accepted until this one has been submitted.

It is recommended that you submit your solutions by friday 19.01. If you cannot meet the recommended deadline, please contact the instructor.

Task 1:
Draw a 3D hypercube with Gray-coded node labels. Draw an 8-leaf binary tree with all leaves mapped to their corresponding hypercube nodes.

The following exercises require you to use code which can be found in the provided archive skeleton.ps1.tgz. When this is transferred to your home area, it can be extracted with the command `tar zxf skeleton.ps1.tgz`.

Task 2:
Log in on Clustis II (clustis2 idi.ntnu.no), compile the provided skeleton program, submit it to the batch system, and examine the output. Explain why the "Hello" lines in the output appear interleaved with the result values, and not as a consecutive block followed by a block of results.

Task 3:
The all-reduce operation (MPI_Allreduce) collects a sum of some local value of each process, and leaves a copy of the global sum by each process. We will implement this operation by passing the value from each process around in a ring, so that each process can add the others' values to its own copy of the global sum. Extend the skeleton program to add up the local variables value in this manner. (The variable rsum contains the result of an equivalent call to MPI_Allreduce, and can be used to verify that your result is correct.)