**Assignment 2: Design and build a control for a mars orbiter and physics simulation**

The control has to account for:

1. Thruster control during the launch phase
2. Thruster control during flight phase
3. Thruster control during orbit insertion

The physics simulation has to account for:

1. Gravity of Earth. Lookup the formulae on the Internet
2. Gravity of Mars.
3. Thruster forces during launch and orbital corrections
4. The following motion laws:
   1. F = m \* a in which F = F\_mars + F\_earth
   2. v = v\_previous + a \* World.period
   3. s = s\_previous + v \* World.period

You don’t have to account for planetary motion

**Stage 1:** First draw up a sequence diagram showing all relevant events and have that checked by the instructor. It should show at least the following:

1. Phase (lauch, flight, orbit)
2. Thruster force magnitude and sign (negative is deceleration)
3. Gravity force magnitude and sign
4. Speed
5. Distance travelled

**Stage 2:** After approval of the sequence diagram program a simple control with a *sweep* method that merely sequences events in the right order and with the right timing without any physics simulation. Configure a sequence diagram (timing diagram) and check that it matches the one you drew up at stage 1. Have your application checked by the instructor.

**Stage 3:** Add the physics simulation as described and connect them using *input* methods for both the control and the physics simulation. Have your application checked by the instructor.

*Points: 1 for free, 2 for stage 1, 3 for stage 2, 4 for stage 3, 1 bonus for visualizing all physics items (to be explained). Max total points 10, unused bonus is valid for other assignment.*