# Freight Elevator - Conceptual Model (DEVS)

SYSC 5104/4906G - Assignment 1

*<<Your Name>> | <<Student Number>> | <<Institution>>*

## Conceptual Description

**Entity & objective:** Model a single freight elevator serving discrete floor requests. Inputs are hall calls (outside_call) and car calls (inside_call). The main observable output is the sequence of serviced floors over time (arrival events).

**Problem:** Given time-stamped call events (requested floor numbers), compute when each request is completed and which floor is serviced at each completion time.

**Assumptions:** single car; travel only; deterministic travel time; simple scheduling.

- Floors are positive integers; initial floor is configurable (default 1).
- Travel time = |targetFloor - currentFloor| minutes (1 minute per floor).
- Door/loading times and capacity limits are ignored.
- Service policy: FIFO; if inside_call and outside_call occur at the same time, inside_call wins the tie-break.

**Structure (2-4 level hierarchy):** The top model is decomposed into two coupled models and three atomic models.

```
FreightElevator (coupled)  in:{inside_call, outside_call}  out:{floor}
  - Ecall    (atomic)  in:{inside_call,outside_call} -> out:{call_gen}
  - Elevator (coupled) in:{acall}              out:{floor}
    - Econtrol (atomic) in:{acall,fback} -> out:{timem,floor}
    - Evehicle (atomic) in:{in}        -> out:{out}
```

```
Couplings:
  Ecall.call_gen -> Elevator.acall -> Econtrol.acall
  Econtrol.timem -> Evehicle.in
  Evehicle.out   -> Econtrol.fback  (feedback)
  Econtrol.floor -> FreightElevator.floor
```

**Component behavior:**

- **Ecall:** Immediately forwards each received call as call_gen (tie-break: inside over outside if simultaneous).
- **Econtrol:** Queues calls; when idle selects next target, computes travelTime, commands Evehicle; on feedback outputs serviced floor and updates currentFloor.
- **Evehicle:** Delays for travelTime then emits a completion signal (feedback to Econtrol).