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EXERCISE: SIMPLE DISTRICT IN IDEAS

GenSim 27 – 10 – 2016

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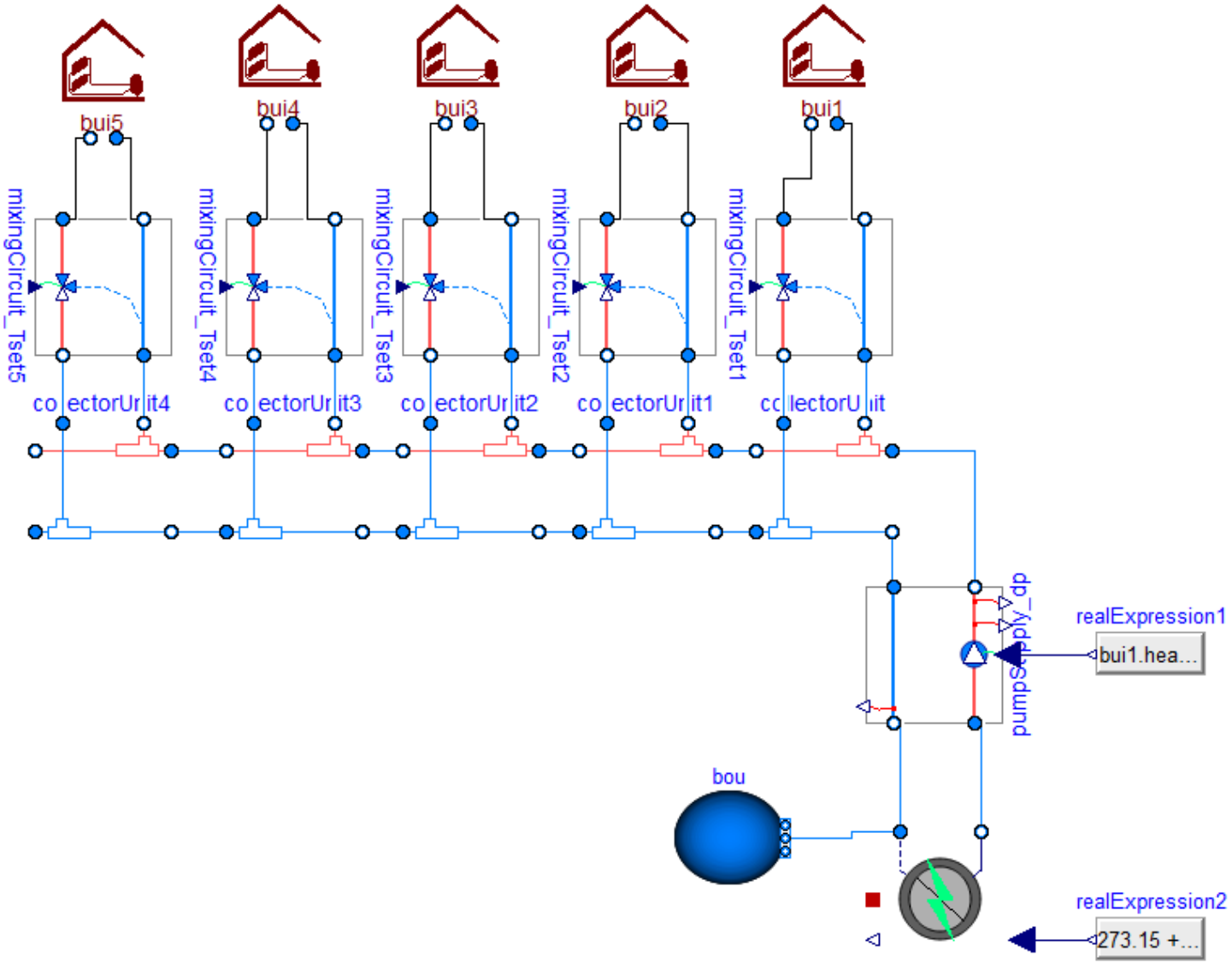
Layout

- Goal: Simple district heating simulation
- Components:
  - 5 Residential dwellings
  - Central (ideal) production
  - Small (simple) distribution network
- Concepts:
  - Reduced order models
  - Stochastic occupant behaviour
  - IDEAS - building templates
  - IDEAS – base circuits


bui5
bui4
bui3
bui2
bui1
mixingCircuit_Tset5
mixingCircuit_Tset4
mixingCircuit_Tset3
mixingCircuit_Tset2
mixingCircuit_Tset1
realExpression1
bui1.hea...
dp_y
pumpSpeed
bou
realExpression2
273.15 +...

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Steps

1. Building structure based on TEASER
2. Building template model using IDEAS/Templates
3. Combine buildings in district network
    1. Using Annex60.Fluid
    2. Using IDEAS.Templates.Basecircuits
4. Implement stochastic occupant behaviour
    1. Generate profiles using StROBe
    2. Change occupant model in IDEAS

Requirements

Modelica:

- IDEAS: specific branch for exercise with additional models https://github.com/GlennReynders/IDEAS/tree/GenSim2016
- Annex60 library
- Gensim.mo https://github.com/ibpsa/project1/blob/master/meetings/2016-10-24-gensim/thursday/District/GenSim16.mo

- Optional
  - TEASER
  - StROBe.py https://github.com/GlennReynders/StROBe/tree/GENSIM

Step 1a: Create R.O. models with TEASER

- 5 dwellings, number_of_elements = 4, export_annex()

Building	Year of construction	nFloors	hFloor	ALeas	Type
GenSim1	1978	3	3.5	200	heavy
GenSim2	1962	2	3	150	Heavy
GenSim3	1966	2	3	180	Heavy
GenSim4	2000	3	3	280	Heavy
GenSim5	1990	3	3	250	Heavy

Step 1a: Create R.O. models with TEASER

- Result
  - GenSim16.TeaserOutput

Step 1.B: Transfer R.O. models to IDEAS

1) Create blank template
    1) name: Bui1
    2) extends from IDEAS.Templates.Interfaces.BaseClasses.Structure
2) Copy code from TEASER model
3) Delete Occupant behaviour part
4) Connect external connectors

Step 1.B: Transfer R.O. models to IDEAS

Result

GenSim16.Structures

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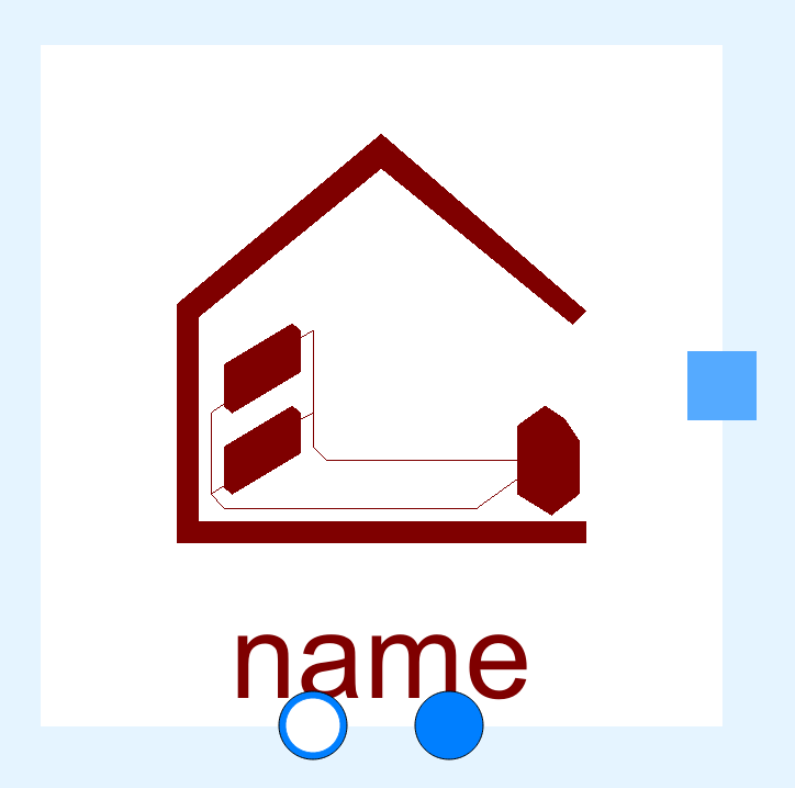
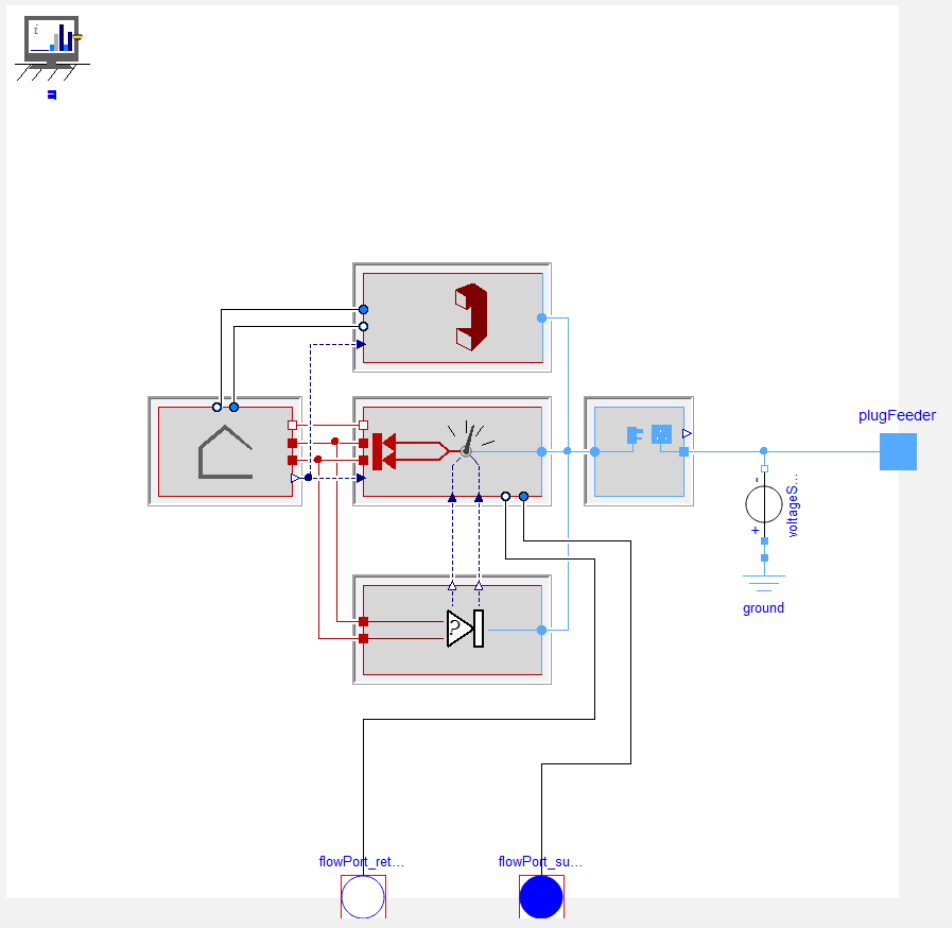
Step 2: Building model using IDEAS.Template

- IDEAS.Templates.Interfaces.Building



Step 2: Building model using IDEAS.Template

- IDEAS.Templates.Interfaces.Building



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Step 3: create neighbourhood

1) Create 5 stand-alone buildings -> QNom?
    1) Structure from TEASER
    2) Ideal radiator heating (with high QNom)
    3) NoOccupant (constant Tset = 21°C)

Step 4: Generate stochastic occupant data

- Result

Step 3: create neighbourhood

1) Create 5 stand-alone buildings -> QNom?
    1) Structure from TEASER
    2) Ideal radiator heating (with high QNom)
    3) NoOccupant (constant Tset = 21°C)

2) Change isDH of building to *true*
3) Change heating system to provided Gensim DHrad2
4) Design ‘district heating system’
    4) IDEAL heater
    5) Mass flow controlled pump

Step 4: create Stochastic

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Step 5: apply stochastic user profiles

- Copy files to IDEAS/IDEAS/Inputs
- Specify files in StrobeInfoManager
- Change occupancy model

Thank you!

"All models are wrong. Some of them are useful." --George Box

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