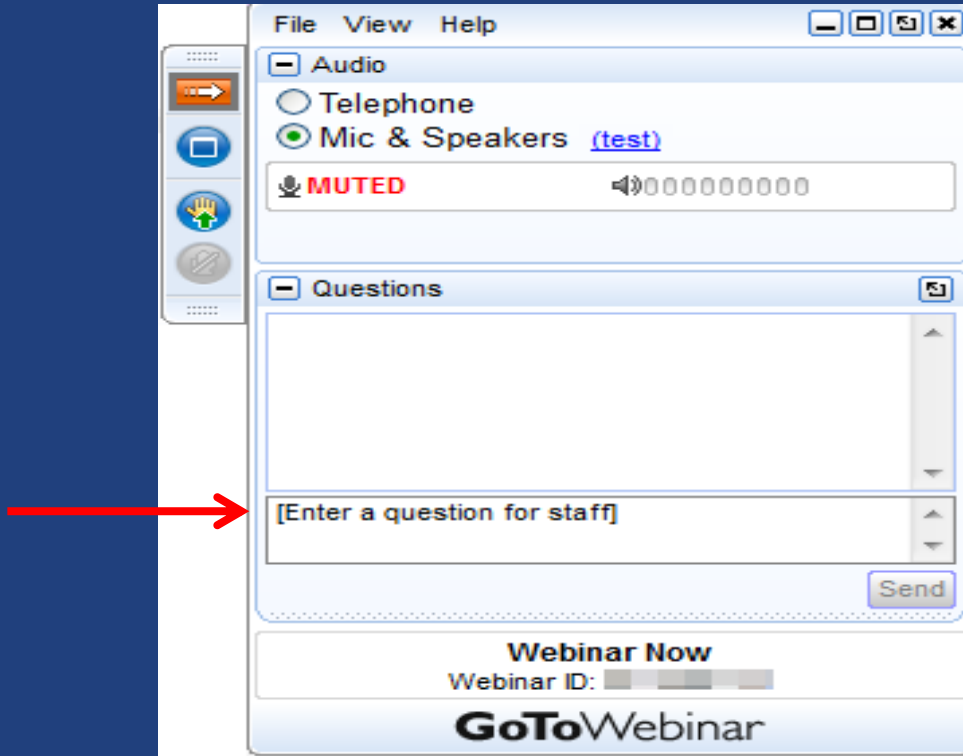




Advanced Expression Building

Tomas Juknevičius, Sr. Systems Analyst

Q&A: Type your questions here



What - Structured Expression Dialog



Query

Edit Query

Select and specify operations to query the model. If several operations are specified, query result will contain elements returned by all of these operations.

Metachain Navigation

Operation Name: Get Dependency-Clients

Metaclass or Stereotype	Property
Requirement [Class]	Supplier Dependency
Dependency	Client

Results Filter by Type: <none>

Standard OK Cancel Help Evaluation Mode



Why - Model Analysis

- Modeling tools live and die by the strength of Analysis functions they provide
- A lot of “active” features in MagicDraw
 - derived properties, custom table columns, relationship criteria in matrices, relation criteria in maps, smart packages, active legends (19.0), model metrics, model validation
- Need to specify computation



Notes

- Will NOT be covering concrete applications
- See an introductory Webinar:
 - <https://www.youtube.com/watch?v=AaPdonhuQM4>
- Some demonstrated features are v19.0

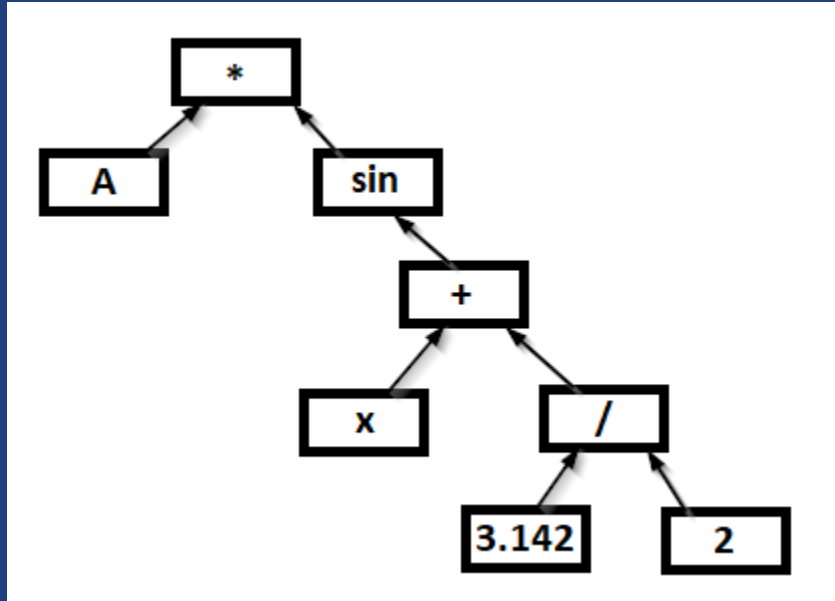


What is Expression Tree?

- Compute $A * \sin(x + \pi / 2)$
 - With $x=1.0472$, $A=3.6$
- Answer 1.8
- How did we compute that?



What is Expression Tree?





Expression Tree Nodes

- Constants
 - Strings, Numbers, model Elements, Collections
- Contextual Variables
 - THIS
- Operations (Functions)
 - Multiple Inputs, Single Output
 - Output of one connected to input of another



Simple(r) Expression

- Demo for Constants - simple Find
- Demo for Operation connecting
 - Metachain on Find Results
- Some pitfalls, recommendations for the dialog GUI
 - Standard/expert mode, root union, predefined nodes
 - Drag&Drop, Copy/Paste
 - Evaluation dialog
 - Naming nodes



Simple(r) Expression

- Quick run through Simple, Metachain operations
- Metachain split with interim operation insertion



Reusable Operations

- OpaqueBehavior
- Parameters, Types
 - java.lang.Object type
 - Type coercion
- Demo – making Set Intersection, calling



Using Scripts

- Define reusable operations
- Inline in another expression
- Available languages, JSR-223
- Available APIs
 - MagicDraw OpenAPI, including non-model objects
(useful classes: ModelHelper, StereotypesHelper, ExpressionHelper)
 - Java API



Using Scripts, Cont

- Demo example – Count/isEmpty
- Demo – diagram contents calculation

Higher Order Operations, Filter



- Filter operation
- Second parameter is special
 - Define operation, do not evaluate it, but pass it as an argument
- Demo – Filter with property test

H0 Operations in General



Higher Order Operations, Map



- Steal it from Cameo Collaborator!
- Definition of Map, MapFlat



HO Operations, Roll-your-own

- Demo - ZipWith
- Demo - Reduce



Recursion

- Best done with derived properties
- Can be encoded in scripts

Putting it All Together



- Demo



Conclusion

- Hereby MagicDraw fell to Greenspun's tenth rule 😊
 - Any sufficiently complicated C or Fortran program contains an ad-hoc, informally-specified, bug-ridden, slow implementation of half of Common Lisp.

https://en.wikipedia.org/wiki/Greenspun%27s_tenth_rule