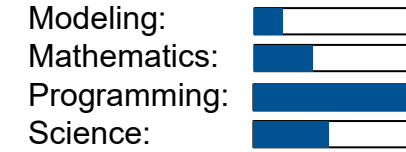


# LSP Implementation for IFC

## Task

This student project aims to develop an **IFC Language Server (LSP)** that enables intelligent editor support for IFC models, focusing on model exploration, semantic navigation, and real-time validation. The system will provide editor-independent features such as autocompletion, hover information, and structural analysis to support learning, debugging, and research workflows.

## Project Characteristics



## Instructions:

- Familiarize yourself with the IFC specification and the Language Server Protocol (LSP) standard.
- Design and implement a parsing pipeline including lexer, parser, and abstract syntax tree (AST) construction.
- Develop core LSP features such as syntax highlighting, go-to-definition, hover information, and diagnostics.
- Integrate the language server with a reference editor and validate functionality using real-world IFC datasets.
- Collaboratively distribute tasks and continuously test and optimize the system for large models.

```
74 #67=IFCPROPERTYINGLEVALUE('WarrantyGuarantorLabor',$,IFCLABEL('WarrantyGuarantorLabor'),$);
75 #68=IFCPROPERTYINGLEVALUE('ExpectedLife',$,IFCLABEL('ExpectedLife'),$);
76 #69=IFCPROPERTYINGLEVALUE('WarrantyGuarantorParts',$,IFCLABEL('WarrantyGuarantorParts'),$);
77 #70=IFCPROPERTYINGLEVALUE('FloorCovering',$,IFCLABEL('FloorCovering'),$);
78 #71=IFCPROPERTYINGLEVALUE('WallCovering',$,IFCLABEL('WallCovering'),$);
79 #72=IFCPROPERTYINGLEVALUE('CeilingCovering',$,IFCLABEL('CeilingCovering'),$);
80 #73=IFCPROPERTYINGLEVALUE('Top Offset',$,IFCLENGTHMEASURE(0.),$);
81 #74=IFCAXIS2PLACEMENT2D(#5,#37);
82 #75=IFCPROPERTYINGLEVALUE('AssetAccountingType',$,IFCLABEL('FIXED'),$);
83 #76=IFCPROPERTYINGLEVALUE('Offset',$,IFCLENGTHMEASURE(0.),$);
84 #77=IFCPROPERTYINGLEVALUE('LoadBearing',$,IFCBOOLEAN(.T.),$);
85 #78=IFCPROPERTYINGLEVALUE('Top Constraint',$,IFCLABEL('Up to level: Roof'),$);
86 #79=IFCPROPERTYINGLEVALUE('FireRating',$,IFCLABEL('FireRating'),$);
87 #80=IFCPROPERTYINGLEVALUE('Base Constraint',$,IFCLABEL('Level 211'),$);
88 #81=IFCDIRECTION((0.0,-1.0));
89 #82=IFCSPACE('0BTBFw6f90Nfh9rPidlXrb',#1,'A203','',,$,686,#16945,'Bedroom 2',.ELEMENT.,.INTERNAL.,$);
90 #83=IFCSPACE('0BTBFw6f90Nfh9rPidl_39',#1,'B203','',,$,683,#16952,'Bedroom 2',.ELEMENT.,.INTERNAL.,$);
91 #84=IFCSPACE('0BTBFw6f90Nfh9rPidlXri',#1,'A201','',,$,17914,#16933,'Hallway',.ELEMENT.,.INTERNAL.,$);
92 #85=IFCPROPERTYINGLEVALUE('Location Line',$,IFCINTEGER(3),$);
93 #86=IFCSLAB('1h0Svn6df7F8_7GcBwlrM',#1,'Floor:Residential - Wood Joist with Subflooring:144872',$,'Floor:Residential - Wood Joist with Subflooring:144872',$);
94 #87=IFCSLAB('1h0Svn6df7F8_7GcBwlrQu',#1,'Floor:Residential - Wood Joist with Subflooring:144800',$,'Floor:Residential - Wood Joist with Subflooring:144800',$);
95 #88=IFCSPACE('0BTBFw6f90Nfh9rPidl_30',#1,'B101','',,$,17713,#16924,'Foyer',.ELEMENT.,.INTERNAL.,$);
96 #89=IFCSPACE('0BTBFw6f90Nfh9rPidlXrr',#1,'A101','',,$,17711,#17014,'Foyer',.ELEMENT.,.INTERNAL.,$);
```

[1] <https://ifc43-docs.standards.buildingsmart.org/>

[2] <https://github.com/AlanRynne/ifc-developer-tools>

[3] <https://microsoft.github.io/language-server-protocol/specifications/lsp/3.17/specification/>