Specifications & Design
For Model Rendering
BY

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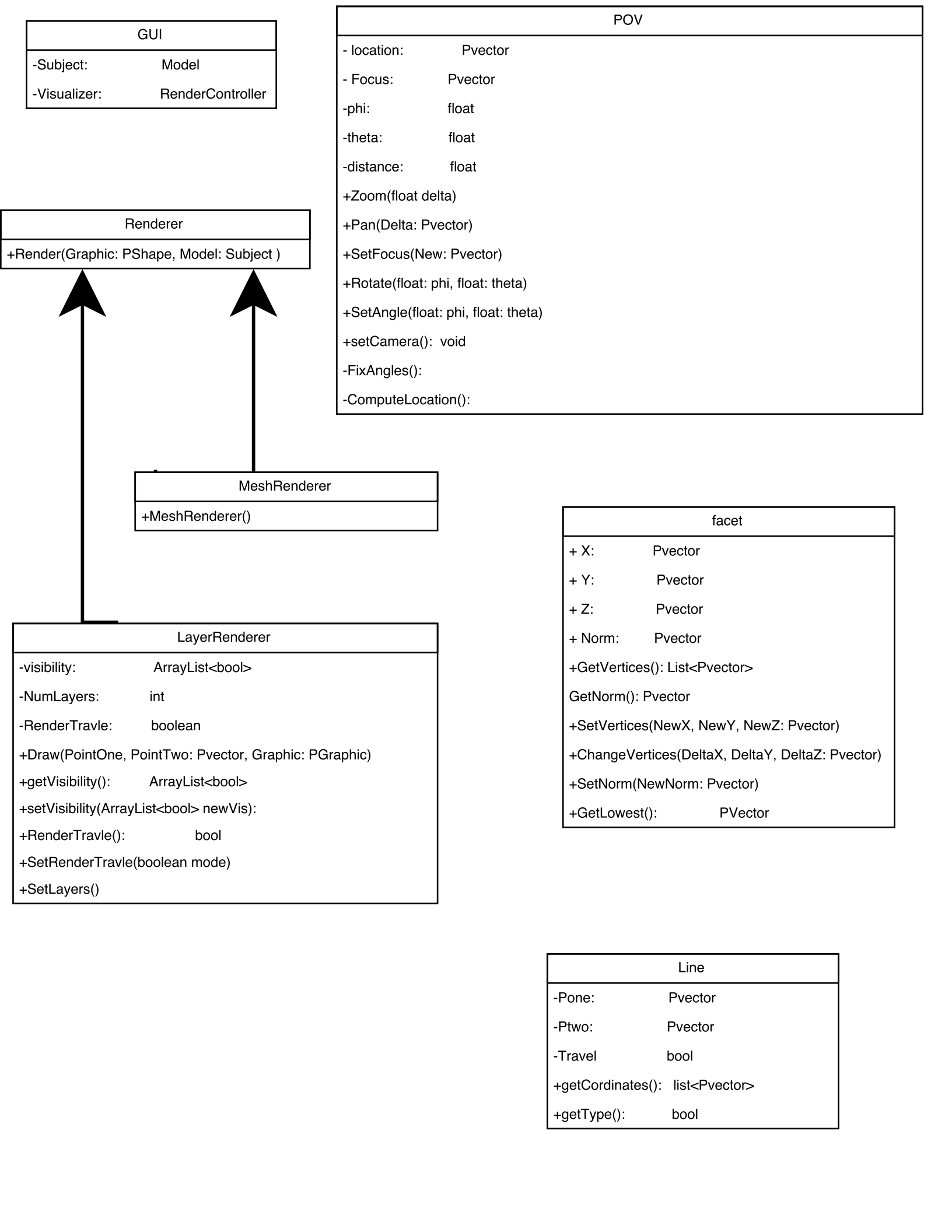
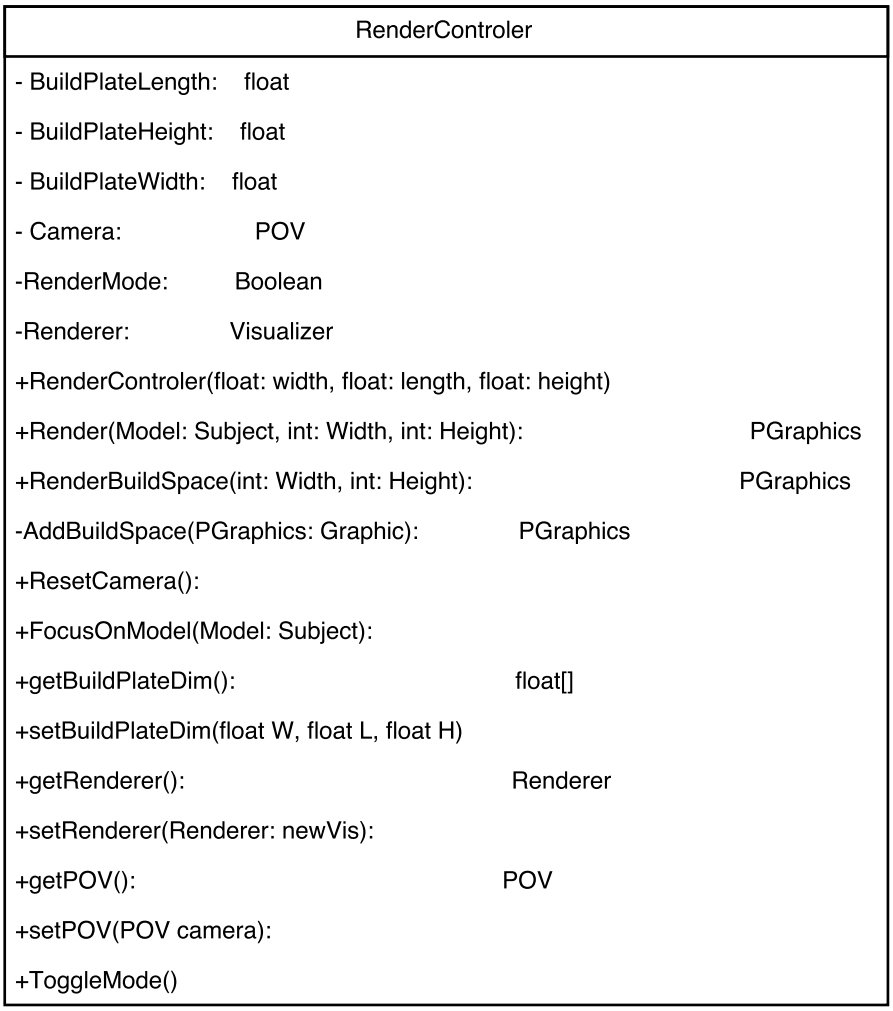
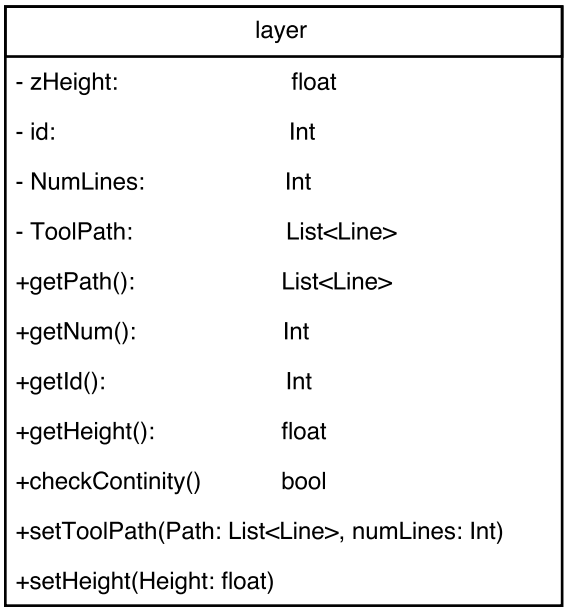
Object Oriented Software Design
Dr. William Joel

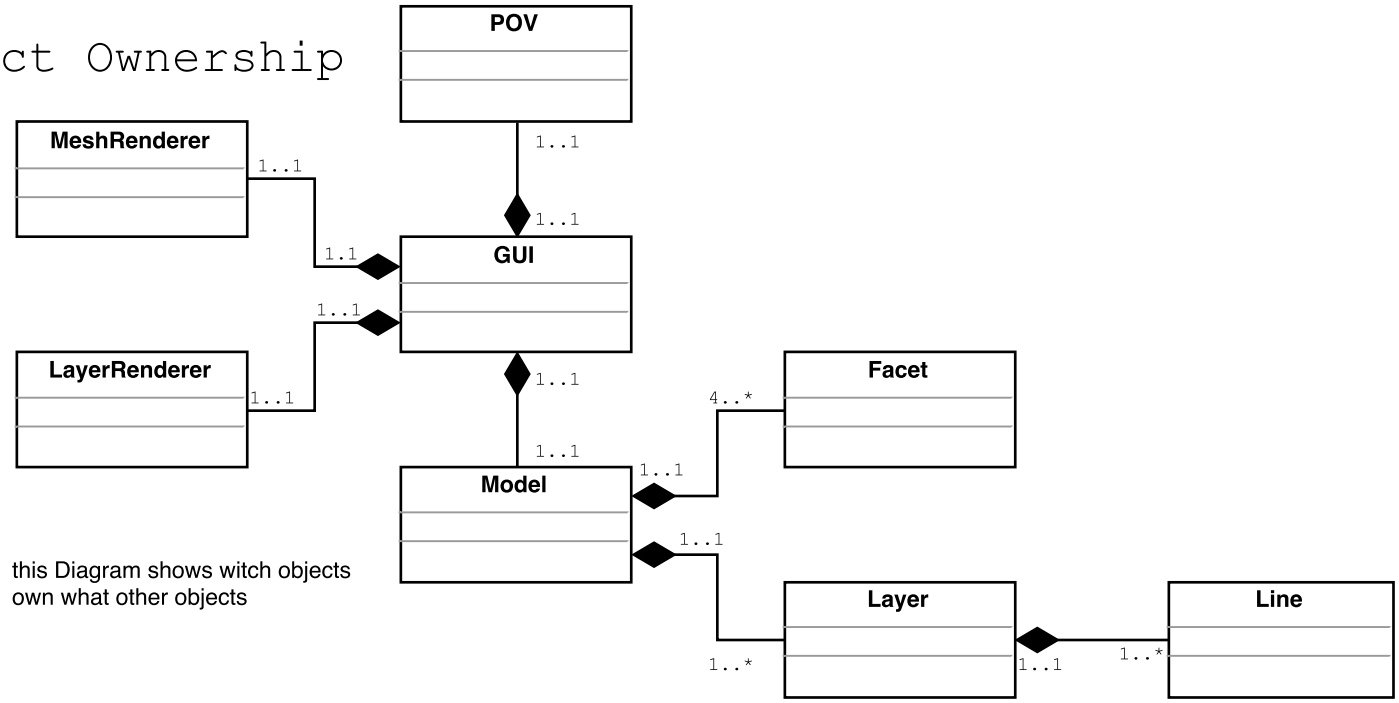

GUI
-Subject: Model
-Visualizer: RenderController
POV
- location: Pvector
- Focus: Pvector
-phi: float
-theta: float
-distance: float
+Zoom(float delta)
+Pan(Delta: Pvector)
+SetFocus(New: Pvector)
+Rotate(float: phi, float: theta)
+SetAngle(float: phi, float: theta)
+setCamera(): void
-FixAngles():
-ComputeLocation():
Renderer
+Render(Graphic: PShape, Model: Subject)
MeshRenderer
+MeshRenderer()
facet
+ X: Pvector
+ Y: Pvector
+ Z: Pvector
+ Norm: Pvector
+GetVertices(): List<Pvector>
GetNorm(): Pvector
+SetVertices(NewX, NewY, NewZ: Pvector)
+ChangeVertices(DeltaX, DeltaY, DeltaZ: Pvector)
+SetNorm(NewNorm: Pvector)
+GetLowest(): PVector
LayerRenderer
-visibility: ArrayList<bool>
-NumLayers: int
-RenderTravle: boolean
+Draw(PointOne, PointTwo: Pvector, Graphic: PGraphic)
+getVisibility(): ArrayList<bool>
+setVisibility(ArrayList<bool> newVis):
+RenderTravle(): bool
+SetRenderTravle(boolean mode)
+SetLayers()
Line
-Pone: Pvector
-Ptwo: Pvector
-Travel bool
+getCordinates(): list<Pvector>
+getType(): bool


Model
- Facets: ArrayList<Facet>
- G-code: ArrayList<String>
- Layers: ArrayList<Layer>
- isModified: Boolean
+Slice(float LayerHeight, float InFill)
+Model(float: LH, float: IF, ArrayList<Facet>: Mesh)
+Scale(factor: Pvector)
+Rotate(factor: Pvector)
+Translate(factor: Pvector)
-Synchronize()
-LevelModel()
+getFacets(): List<Facet>
+SetFacets(ArrayList<Facet> newFacets)
+getGcode(): ArrayList<String>
+getLayers(): ArrayList<Layer>
+IsModifed(): Boolean
+GetInFill(): Float
+SettInFill(Float: IF):
+GetLayerHeight(): Float
+SetLayerHeight(Float: LH)


RenderControler
- BuildPlateLength: float
- BuildPlateHeight: float
- BuildPlateWidth: float
- Camera: POV
-RenderMode: Boolean
-Renderer: Visualizer
+RenderControler(float: width, float: length, float: height)
+Render(Model: Subject, int: Width, int: Height): PGraphics
+RenderBuildSpace(int: Width, int: Height): PGraphics
-AddBuildSpace(PGraphics: Graphic): PGraphics
+ResetCamera():
+FocusOnModel(Model: Subject):
+getBuildPlateDim(): float[]
+setBuildPlateDim(float W, float L, float H)
+getRenderer(): Renderer
+setRenderer(Renderer: newVis):
+getPOV(): POV
+setPOV(POV camera):
+ToggleMode()


layer
- zHeight: float
- id: Int
- NumLines: Int
- ToolPath: List<Line>
+getPath(): List<Line>
+getNum(): Int
+getId(): Int
+getHeight(): float
+checkContinity() bool
+setToolPath(Path: List<Line>, numLines: Int)
+setHeight(Height: float)

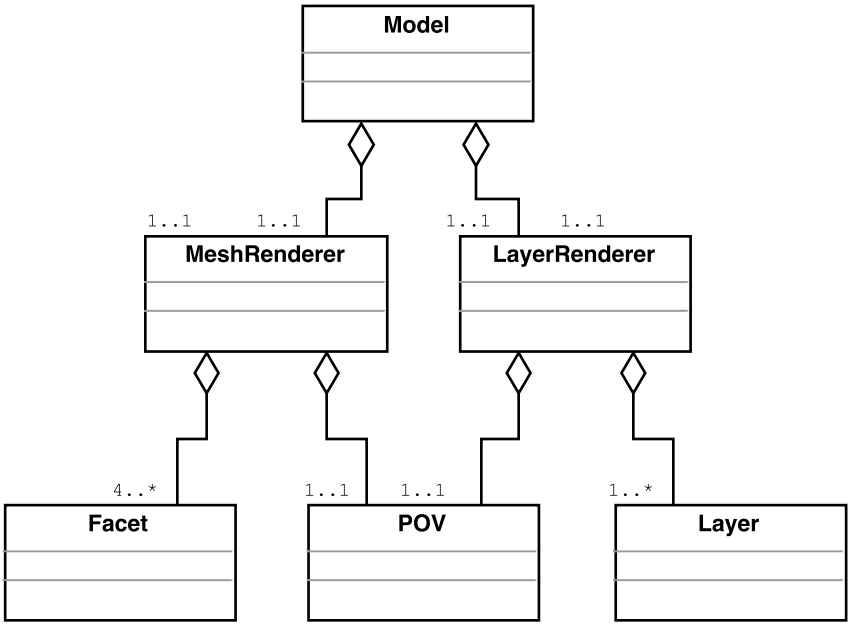
Object Ownership



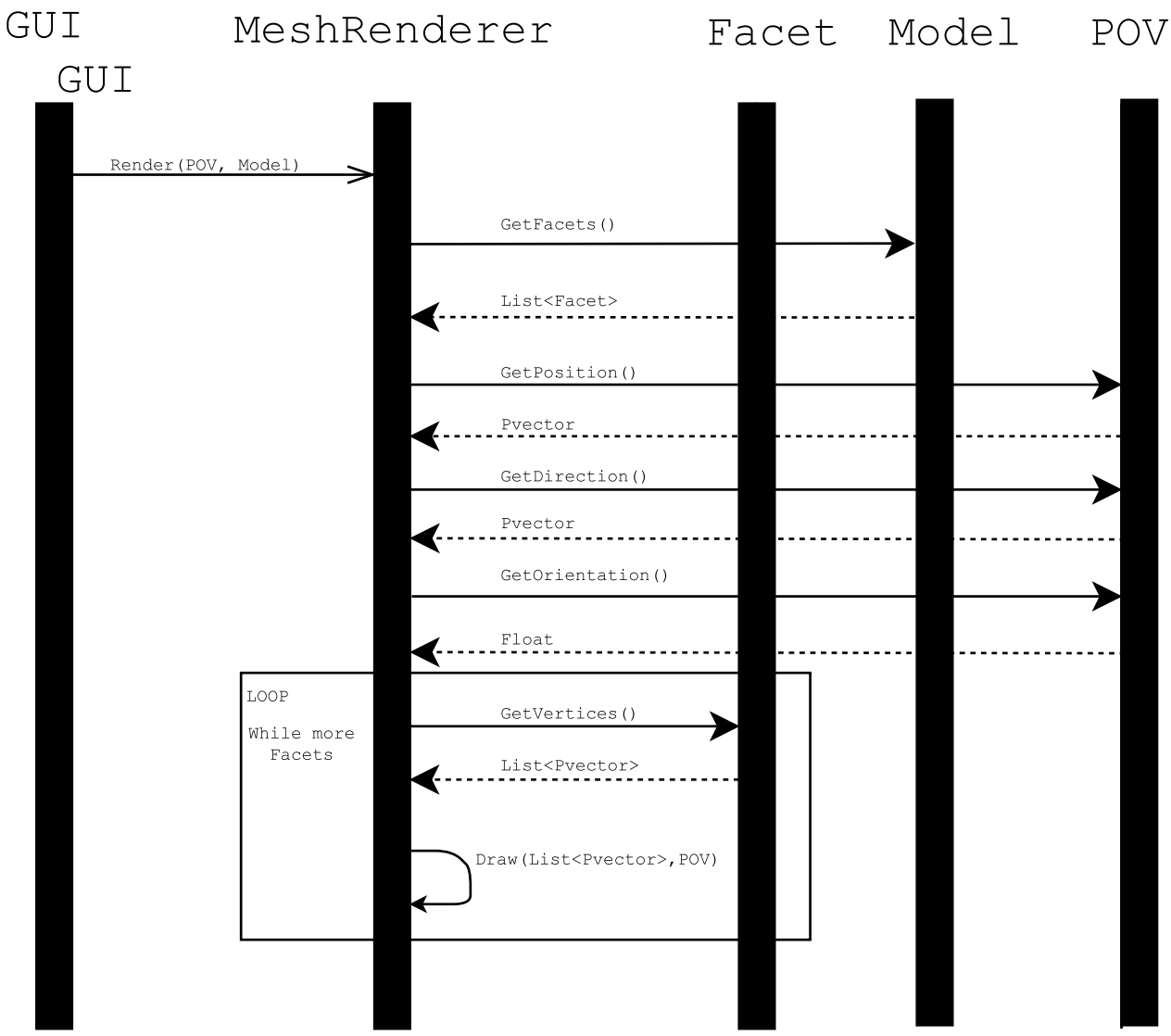
this Diagram shows witch objects own what other objects

Object Usage

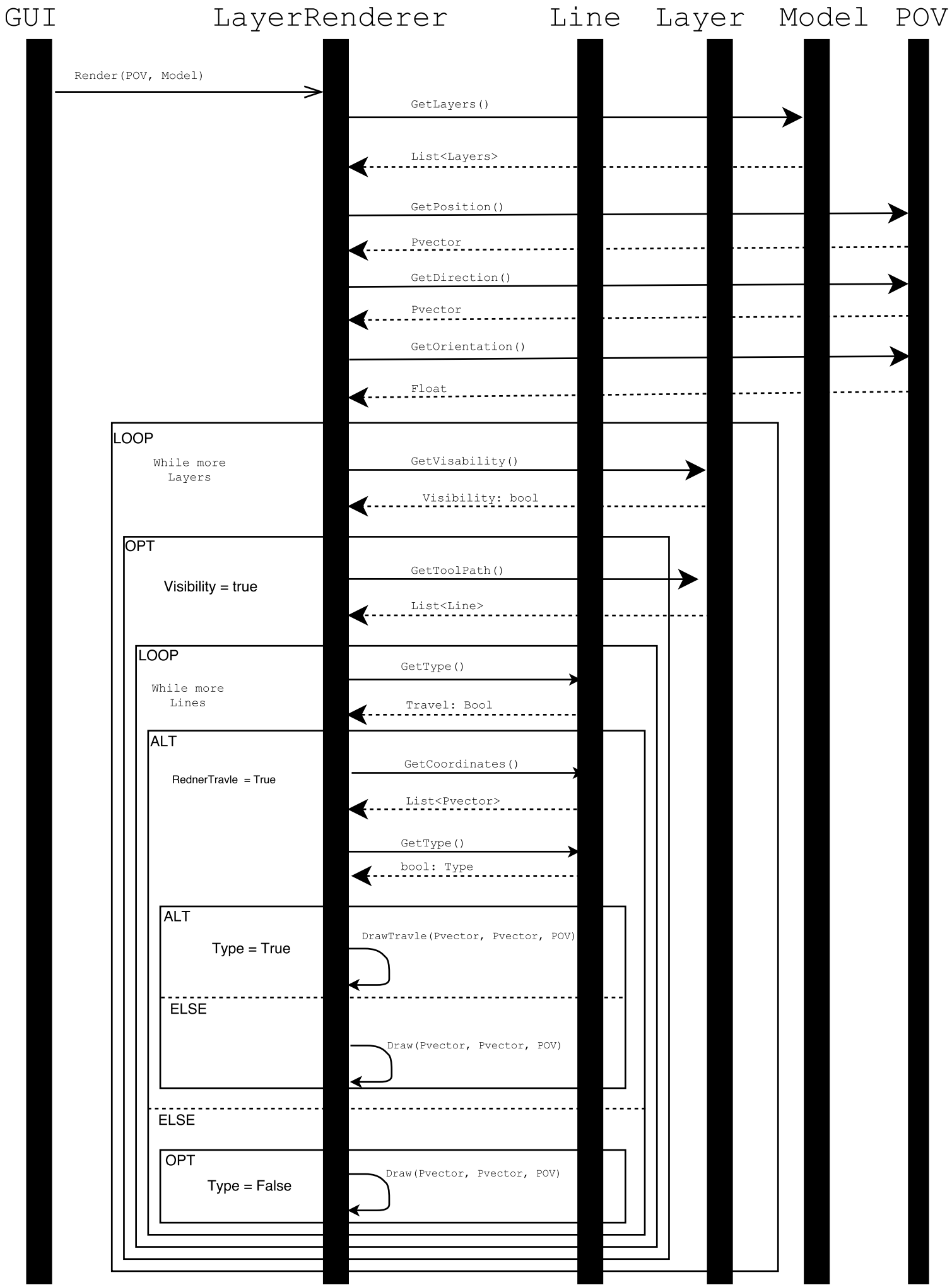
This Diagram shows witch objects read data from which other objects



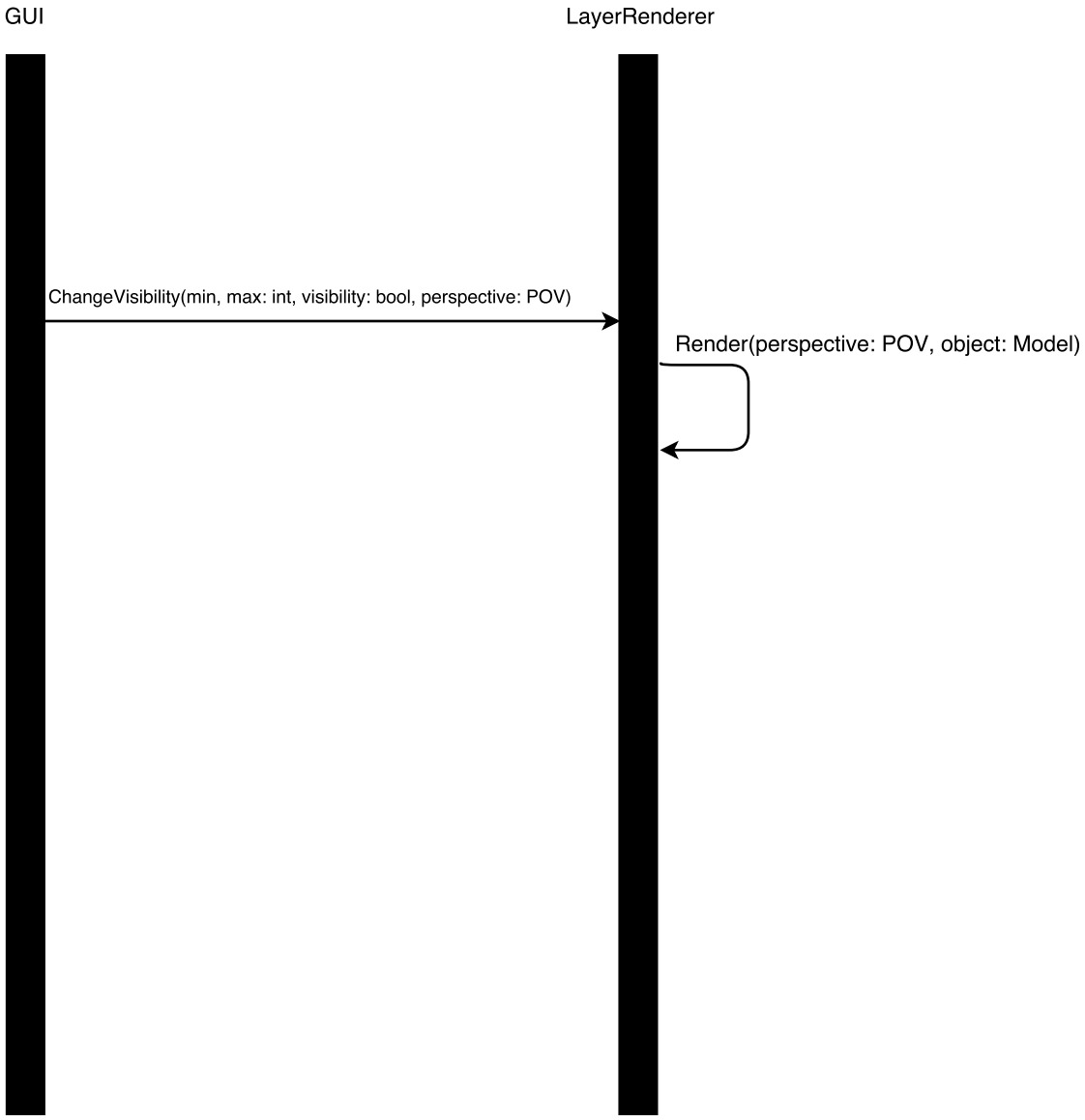
Render Mesh


GUI
MeshRenderer
Facet
Model
POV
GUI
Render(POV, Model)
GetFacets()
List<Facet>
GetPosition()
Pvector
GetDirection()
Pvector
GetOrientation()
Float
LOOP
While more Facets
GetVertices()
List<Pvector>
Draw(List<Pvector>,POV)

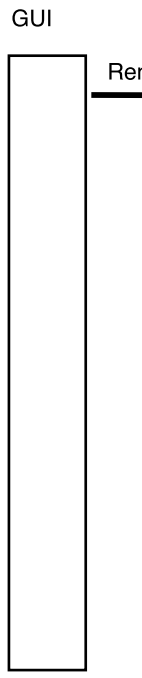
Render Layer

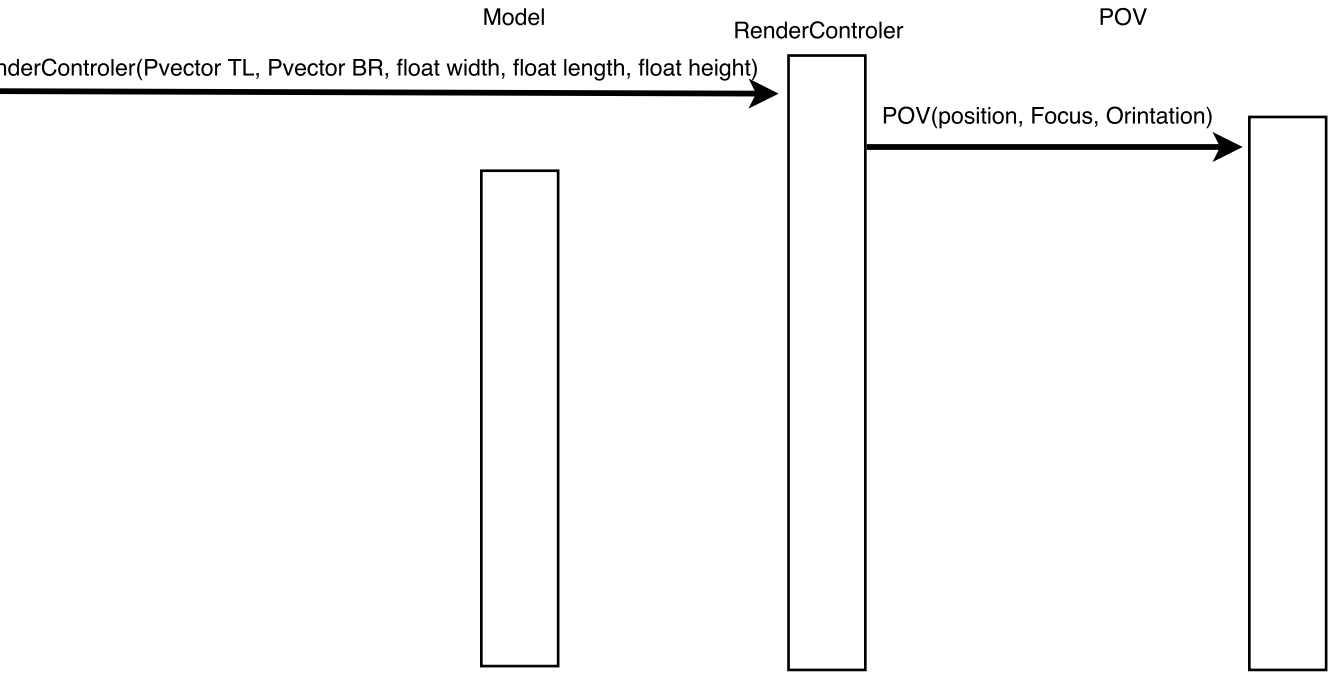


Change layer Visibility
or render mode in Layer Render

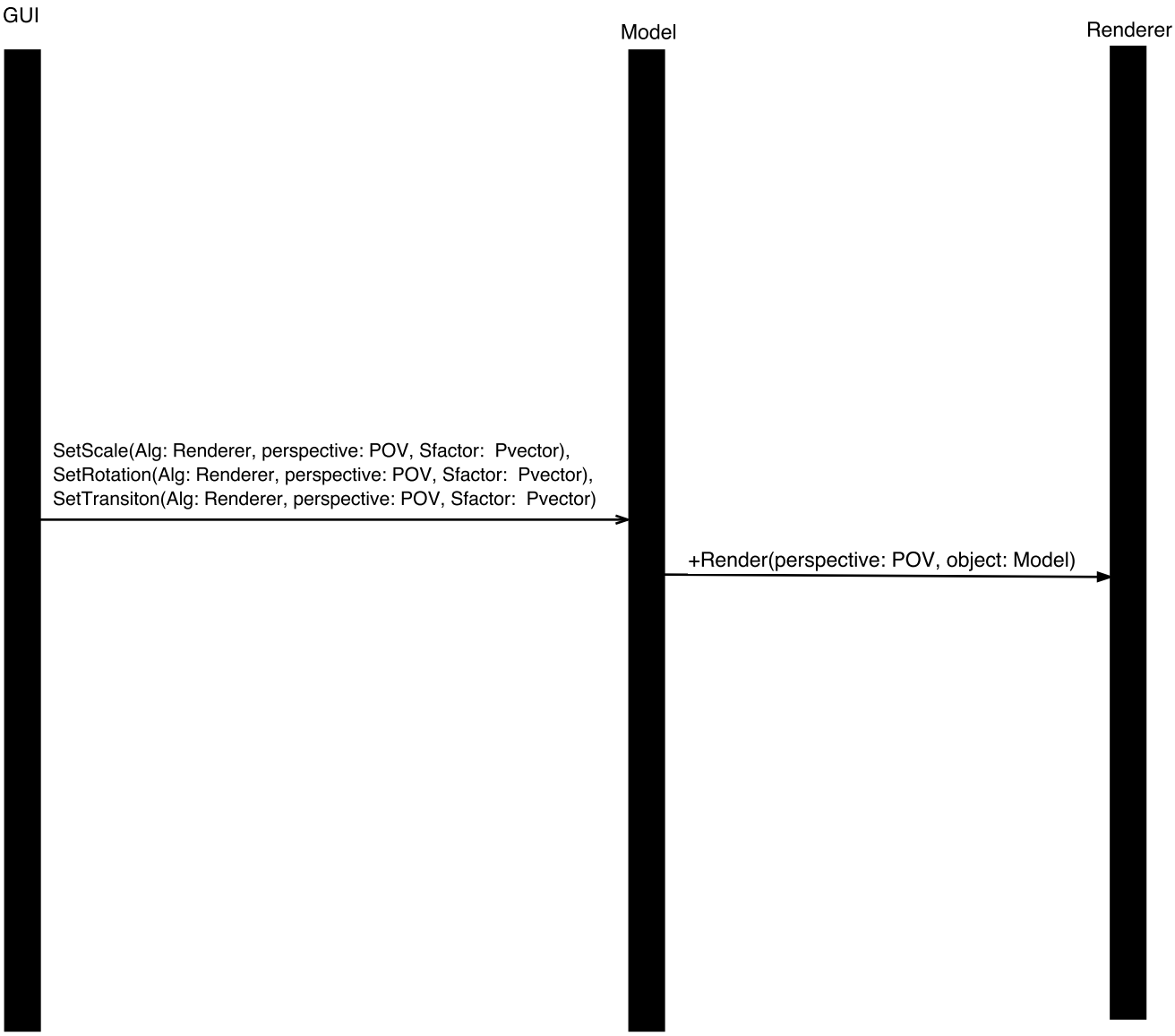


Change Any Attribute of POV


GUI
Ren

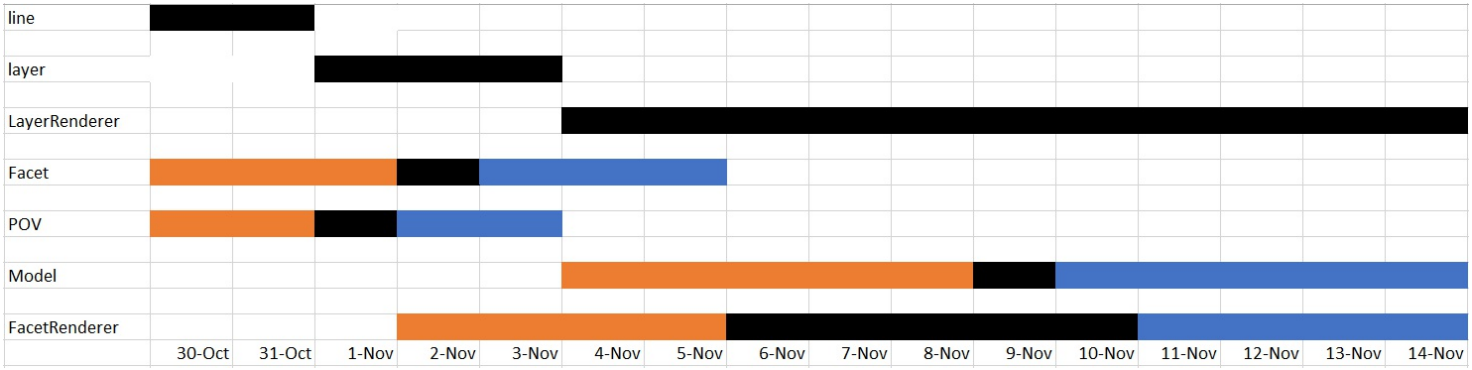

Model
RenderControler
POV
nderControler(Pvector TL, Pvector BR, float width, float length, float height)
POV(position, Focus, Orintation)

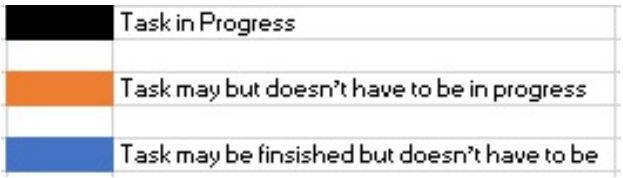
Change Scale, Rotation, or Translation in Model



Gantt Chart

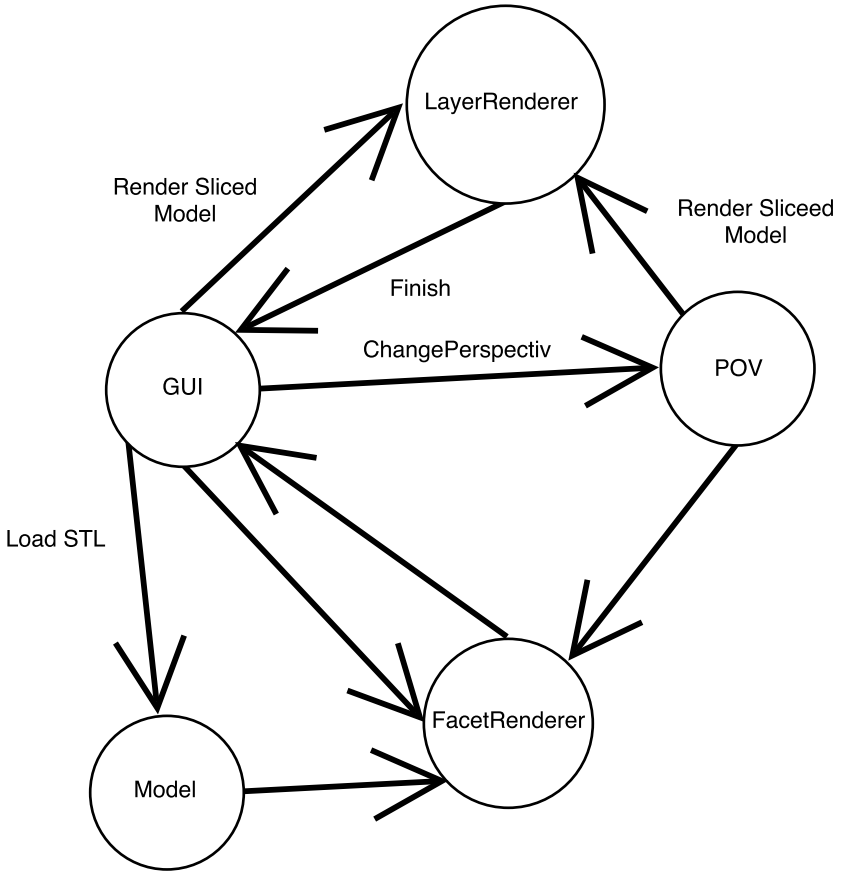
task	duration	Precedence	ES	EF	LS	LF	slack	critical
line	2		0	2	0	2	0	y
layer	3	line	2	5	2	5	0	y
Facet	3		0	3	0	3	4	n
POV	3		0	3	0	3	2	n
Model	6	Facet, Layer	5	11	5	11	5	n
FacetRenderer	9	Facet, POV	3	12	3	12	4	n
LayerRenderer	11	Layer, POV	5	16	5	16	0	y





Deliverables

Deliverable One: All functionality of the class Line is Implemented	Oct 31
Deliverable Two: All functionality of the classes Layer & POV is Implemented	Nov 3
Deliverable Three: All functionality of the class facet is implemented	Nov 5
Deliverable Four: All Functionality of the classes Model & FacetRenderer is implemented	Nov 14
Deliverable Five: All Functionality of the class LayerRenderer is Implemented	Nov 14


LayerRenderer
Render Sliced Model
Render Sliceed Model
Finish
ChangePerspectiv
GUI
POV
Load STL
FacetRenderer
Model