The VRML97 Quick Reference
AGM - STL - UPMC

PROTO Syntax

```
PROTO PrototypeName [
  eventIn       eventtype  name
  eventOut      eventtype  name
  exposedField  fieldtype  name  defaultValue
  field         fieldtype  name  defaultValue
  ...
] {
  # definition of ROUTEs
  # definition of Nodes
  ...
}
```

EXTERNPROTO Syntax

```
PROTO PrototypeName [
  eventIn       eventtype  name
  eventOut      eventtype  name
  exposedField  fieldtype  name  defaultValue
  field         fieldtype  name  defaultValue
  ...
]
"URL/URN" or ["URL/URN", "URL/URN", ... ]
```

Node Summary

```
Anchor {
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField MFNode   children        []
  exposedField SFString description     ""
  exposedField MFString parameter       []
  exposedField MFString url             []
  field        SFVec3f  bboxCenter      0 0 0     # (-inf,inf)
  field        SFVec3f  bboxSize        -1 -1 -1  # (0,inf) or -1,-1,-1
}
Appearance {
  exposedField SFNode material          NULL
  exposedField SFNode texture           NULL
  exposedField SFNode textureTransform  NULL
}
AudioClip {
  exposedField   SFString description      ""
  exposedField   SFBool   loop             FALSE
  exposedField   SFFloat  pitch            1.0       # (0,inf)
  exposedField   SFTime   startTime        0         # (-inf,inf)
  exposedField   SFTime   stopTime         0         # (-inf,inf)
  exposedField   MFString url              []
  eventOut       SFTime   duration_changed
  eventOut       SFBool   isActive
}
Background {
  eventIn      SFBool   set_bind
  exposedField MFFloat  groundAngle  []            # [0,Pi/2]
  exposedfield MFColor  groundColor  []            # [0,1]
  exposedField MFString backUrl      []
  exposedField MFString bottomUrl    []
  exposedField MFString frontUrl     []
  exposedField MFString leftUrl      []
  exposedField MFString rightUrl     []
  exposedField MFString topUrl       []
  exposedField MFFloat  skyAngle     []            # [0,inf]
  exposedField MFColor  skyColor     [ 0 0 0 ]     # [0,1]
  eventOut     SFBool   isBound
}
Billboard {
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField SFVec3f  axisOfRotation  0 1 0      # (-inf,inf)
  exposedField MFNode   children        []
  field        SFVec3f  bboxCenter      0 0 0      # (-inf,inf)
  field        SFVec3f  bboxSize        -1 -1 -1   # (0,inf) or -1,-1,-1
}

Box {
  field    SFVec3f size  2 2 2       # (0, )
}
Collision {
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField MFNode   children        []
  exposedField SFBool   collide         TRUE
  field        SFVec3f  bboxCenter      0 0 0      # (-inf,inf)
  field        SFVec3f  bboxSize        -1 -1 -1   # (0,inf) or -1,-1,-1
  field        SFNode   proxy           NULL
  eventOut     SFTime   collideTime
}
Color {
  exposedField MFColor color  []         # [0,1]
}
ColorInterpolator {
  eventIn      SFFloat set_fraction       # (-inf,inf)
  exposedField MFFloat key           []    # (-inf,inf)
  exposedField MFColor keyValue      []    # [0,1]
  eventOut     SFColor value_changed
}
Cone {
  field     SFFloat   bottomRadius 1        # (0,inf)
  field     SFFloat   height       2        # (0,inf)
  field     SFBool    side         TRUE
  field     SFBool    bottom       TRUE
}
Coordinate {
  exposedField MFVec3f point  []      # (-inf,inf)
}
CoordinateInterpolator {
  eventIn      SFFloat set_fraction       # (-inf,inf)
  exposedField MFFloat key           []    # (-inf,inf)
  exposedField MFVec3f keyValue      []    # (-inf,inf)
  eventOut     MFVec3f value_changed
}
Cylinder {
  field    SFBool    bottom  TRUE
  field    SFFloat   height  2         # (0,inf)
  field    SFFloat   radius  1         # (0,inf)
  field    SFBool    side    TRUE
  field    SFBool    top     TRUE
}
CylinderSensor {
  exposedField SFBool     autoOffset TRUE
  exposedField SFFloat    diskAngle  0.262       # (0,/2)
  exposedField SFBool     enabled    TRUE
  exposedField SFFloat    maxAngle   -1          # [-2,2]
  exposedField SFFloat    minAngle   0           # [-2,2]
  exposedField SFFloat    offset     0           # (-inf,inf)
  eventOut     SFBool     isActive
  eventOut     SFRotation rotation_changed
  eventOut     SFVec3f    trackPoint_changed
}
DirectionalLight {
  exposedField SFFloat ambientIntensity  0        # [0,1]
  exposedField SFColor color             1 1 1    # [0,1]
  exposedField SFVec3f direction         0 0 -1   # (-inf,inf)
  exposedField SFFloat intensity         1        # [0,1]
  exposedField SFBool  on                TRUE
}
ElevationGrid {
  eventIn      MFFloat  set_height
  exposedField SFNode   color            NULL
  exposedField SFNode   normal           NULL
  exposedField SFNode   texCoord         NULL
  field        MFFloat  height           []      # (-inf,inf)
  field        SFBool   ccw              TRUE
  field        SFBool   colorPerVertex   TRUE
  field        SFFloat  creaseAngle      0       # [0,inf]
  field        SFBool   normalPerVertex  TRUE
  field        SFBool   solid            TRUE
  field        SFInt32  xDimension       0       # [0,inf)
  field        SFFloat  xSpacing         1.0     # (0,inf)
  field        SFInt32  zDimension       0       # [0,inf)
  field        SFFloat  zSpacing         1.0     # (0,inf)
}
Extrusion {
  eventIn MFVec2f    set_crossSection
  eventIn MFRotation set_orientation
  eventIn MFVec2f    set_scale
  eventIn MFVec3f    set_spine
  field   SFBool     beginCap         TRUE
  field   SFBool     ccw              TRUE
  field   SFBool     convex           TRUE
  field   SFFloat    creaseAngle      0               # [0,inf)
  field   MFVec2f    crossSection     [ 1 1, 1 -1, -1 -1,
                                       -1 1, 1  1 ]    # (-inf,inf)
  field   SFBool     endCap           TRUE
  field   MFRotation orientation      0 0 1 0         # [-1,1],(-inf,inf)
  field   MFVec2f    scale            1 1             # (0,inf)
  field   SFBool     solid            TRUE
  field   MFVec3f    spine            [ 0 0 0, 0 1 0 ] # (-inf,inf)
}
Fog {
  exposedField SFColor  color            1 1 1      # [0,1]
  exposedField SFString fogType          "LINEAR"
  exposedField SFFloat  visibilityRange  0          # [0,inf)
  eventIn      SFBool   set_bind
  eventOut     SFBool   isBound
}
FontStyle {
  field MFString family       ["SERIF"]
  field SFBool   horizontal   TRUE
  field MFString justify      "BEGIN"
  field SFString language     ""
  field SFBool   leftToRight  TRUE
  field SFFloat  size         1.0          # (0,inf)
  field SFFloat  spacing      1.0          # [0,inf)
  field SFString style        "PLAIN"
  field SFBool   topToBottom  TRUE
}
Group {
  eventIn      MFNode  addChildren
  eventIn      MFNode  removeChildren
  exposedField MFNode  children       []
  field        SFVec3f bboxCenter     0 0 0     # (-inf,inf)
  field        SFVec3f bboxSize       -1 -1 -1  # (0,inf) or -1,-1,-1
}
ImageTexture {
  exposedField MFString url     []
  field        SFBool   repeatS TRUE
  field        SFBool   repeatT TRUE
}
IndexedFaceSet {
  eventIn       MFInt32 set_colorIndex
  eventIn       MFInt32 set_coordIndex
  eventIn       MFInt32 set_normalIndex
  eventIn       MFInt32 set_texCoordIndex
  exposedField  SFNode  color             NULL
  exposedField  SFNode  coord             NULL
  exposedField  SFNode  normal            NULL
  exposedField  SFNode  texCoord          NULL
  field         SFBool  ccw               TRUE
  field         MFInt32 colorIndex        []        # [-1,inf)
  field         SFBool  colorPerVertex    TRUE
  field         SFBool  convex            TRUE
  field         MFInt32 coordIndex        []        # [-1,inf)
  field         SFFloat creaseAngle       0         # [0,)
  field         MFInt32 normalIndex       []        # [-1,inf)
  field         SFBool  normalPerVertex   TRUE
  field         SFBool  solid             TRUE
  field         MFInt32 texCoordIndex     []        # [-1,inf)
}
IndexedLineSet {
  eventIn       MFInt32 set_colorIndex
  eventIn       MFInt32 set_coordIndex
  exposedField  SFNode  color             NULL
  exposedField  SFNode  coord             NULL
  field         MFInt32 colorIndex        []     # [-1,inf)
  field         SFBool  colorPerVertex    TRUE
  field         MFInt32 coordIndex        []     # [-1,inf)
}

Inline {
  exposedField MFString url        []
  field        SFVec3f  bboxCenter 0 0 0     # (-inf,inf)
  field        SFVec3f  bboxSize   -1 -1 -1  # (0,inf) or -1,-1,-1
}
```

```
LOD {
  exposedField MFNode  level    []
  field        SFVec3f center   0 0 0    # (-inf,inf)
  field        MFFloat range    []       # (0,inf)
}

Material {
  exposedField SFFloat ambientIntensity  0.2         # [0,1]
  exposedField SFColor diffuseColor      0.8 0.8 0.8 # [0,1]
  exposedField SFColor emissiveColor     0 0 0       # [0,1]
  exposedField SFFloat shininess         0.2         # [0,1]
  exposedField SFColor specularColor     0 0 0       # [0,1]
  exposedField SFFloat transparency      0           # [0,1]
}

MovieTexture {
  exposedField SFBool   loop             FALSE
  exposedField SFFloat  speed            1.0      # (-inf,inf)
  exposedField SFTime   startTime        0        # (-inf,inf)
  exposedField SFTime   stopTime         0        # (-inf,inf)
  exposedField MFString url              []
  field        SFBool   repeatS          TRUE
  field        SFBool   repeatT          TRUE
  eventOut     SFTime   duration_changed
  eventOut     SFBool   isActive
}
NavigationInfo {
  eventIn      SFBool   set_bind
  exposedField MFFloat  avatarSize      [0.25, 1.6, 0.75] # [0,inf)
  exposedField SFBool   headlight       TRUE
  exposedField SFFloat  speed           1.0               # [0,inf)
  exposedField MFString type            ["WALK", "ANY"]
  exposedField SFFloat  visibilityLimit 0.0               # [0,inf)
  eventOut     SFBool   isBound
}

Normal {
  exposedField MFVec3f vector  []   # (-inf,inf)
}
NormalInterpolator {
  eventIn      SFFloat set_fraction       # (-inf,inf)
  exposedField MFFloat key           []   # (-inf,inf)
  exposedField MFVec3f keyValue      []   # (-inf,inf)
  eventOut     MFVec3f value_changed
}

OrientationInterpolator {
  eventIn      SFFloat    set_fraction      # (-inf,inf)
  exposedField MFFloat    key           []  # (-inf,inf)
  exposedField MFRotation keyValue      []  # [-1,1],(-inf,inf)
  eventOut     SFRotation value_changed
}

PixelTexture {
  exposedField SFImage  image      0 0 0    # see "5.5 SFImage"
  field        SFBool   repeatS    TRUE
  field        SFBool   repeatT    TRUE
}
PlaneSensor {
  exposedField SFBool  autoOffset          TRUE
  exposedField SFBool  enabled             TRUE
  exposedField SFVec2f maxPosition         -1 -1     # (-inf,inf)
  exposedField SFVec2f minPosition         0 0       # (-inf,inf)
  exposedField SFVec3f offset              0 0 0     # (-inf,inf)
  eventOut     SFBool  isActive
  eventOut     SFVec3f trackPoint_changed
  eventOut     SFVec3f translation_changed
}
PointLight {
  exposedField SFFloat ambientIntensity  0       # [0,1]
  exposedField SFVec3f attenuation       1 0 0   # [0,inf)
  exposedField SFColor color             1 1 1   # [0,1]
  exposedField SFFloat intensity         1       # [0,1]
  exposedField SFVec3f location          0 0 0   # (-inf,inf)
  exposedField SFBool  on                TRUE
  exposedField SFFloat radius            100     # [0,inf)
}
PointSet {
  exposedField  SFNode  color      NULL
  exposedField  SFNode  coord      NULL
}
PositionInterpolator {
  eventIn      SFFloat set_fraction        # (-inf,inf)
  exposedField MFFloat key           []    # (-inf,inf)
  exposedField MFVec3f keyValue      []    # (-inf,inf)
  eventOut     SFVec3f value_changed
}
ProximitySensor {
  exposedField SFVec3f    center      0 0 0    # (-inf,inf)
  exposedField SFVec3f    size        0 0 0    # [0,inf)
  exposedField SFBool     enabled     TRUE
  eventOut     SFBool     isActive
  eventOut     SFVec3f    position_changed
  eventOut     SFRotation orientation_changed
  eventOut     SFTime     enterTime
  eventOut     SFTime     exitTime
}
ScalarInterpolator {
  eventIn      SFFloat set_fraction         # (-inf,inf)
  exposedField MFFloat key           []     # (-inf,inf)
  exposedField MFFloat keyValue      []     # (-inf,inf)
  eventOut     SFFloat value_changed
}

Script {
  exposedField MFString url           []
  field        SFBool   directOutput  FALSE
  field        SFBool   mustEvaluate  FALSE
  # And any number of:
  eventIn      eventType eventName
  field        fieldType fieldName initialValue
  eventOut     eventType eventName
}

Shape {
  exposedField SFNode appearance NULL
  exposedField SFNode geometry   NULL
}
Sound {
  exposedField SFVec3f  direction     0 0 1   # (-inf,inf)
  exposedField SFFloat  intensity     1       # [0,1]
  exposedField SFVec3f  location      0 0 0   # (-inf,inf)
  exposedField SFFloat  maxBack       10      # [0,inf)
  exposedField SFFloat  maxFront      10      # [0,inf)
  exposedField SFFloat  minBack       1       # [0,inf)
  exposedField SFFloat  minFront      1       # [0,inf)
  exposedField SFFloat  priority      0       # [0,1]
  exposedField SFNode   source        NULL
  field        SFBool   spatialize    TRUE
}
Sphere {
  field SFFloat radius  1    # (0,)
}

SphereSensor {
  exposedField SFBool     autoOffset        TRUE
  exposedField SFBool     enabled           TRUE
  exposedField SFRotation offset            0 1 0 0  # [-1,1],(-inf,inf)
  eventOut     SFBool     isActive
  eventOut     SFRotation rotation_changed
  eventOut     SFVec3f    trackPoint_changed
}
SpotLight {
  exposedField SFFloat ambientIntensity  0         # [0,1]
  exposedField SFVec3f attenuation       1 0 0     # [0,inf)
  exposedField SFFloat beamWidth         1.570796  # (0,pi/2]
  exposedField SFColor color             1 1 1     # [0,1]
  exposedField SFFloat cutOffAngle       0.785398  # (0,/2]
  exposedField SFVec3f direction         0 0 -1    # (-inf,inf)
  exposedField SFFloat intensity         1         # [0,1]
  exposedField SFVec3f location          0 0 0     # (-inf,inf)
  exposedField SFBool  on                TRUE
  exposedField SFFloat radius            100       # [0,inf)
}
Switch {
  exposedField    MFNode  choice      []
  exposedField    SFInt32 whichChoice -1    # [-1,)
}
Text {
  exposedField  MFString string    []
  exposedField  SFNode   fontStyle NULL
  exposedField  MFFloat  length    []      # [0,inf)
  exposedField  SFFloat  maxExtent 0.0     # [0,inf)
}
TextureTransform {
  exposedField SFVec2f center      0 0     # (-inf,inf)
  exposedField SFFloat rotation    0       # (-inf,inf)
  exposedField SFVec2f scale       1 1     # (-inf,inf)
  exposedField SFVec2f translation 0 0     # (-inf,inf)
}
TimeSensor {
  exposedField SFTime   cycleInterval 1       # (0,inf)
  exposedField SFBool   enabled       TRUE
  exposedField SFBool   loop          FALSE
  exposedField SFTime   startTime     0       # (-inf,inf)
  exposedField SFTime   stopTime      0       # (-inf,inf)
  eventOut     SFTime   cycleTime
  eventOut     SFFloat  fraction_changed
  eventOut     SFBool   isActive
  eventOut     SFTime   time
}

TouchSensor {
  exposedField SFBool  enabled TRUE
  eventOut     SFVec3f hitNormal_changed
  eventOut     SFVec3f hitPoint_changed
  eventOut     SFVec2f hitTexCoord_changed
  eventOut     SFBool  isActive
  eventOut     SFBool  isOver
  eventOut     SFTime  touchTime
}

Transform {
  eventIn      MFNode      addChildren
  eventIn      MFNode      removeChildren
  exposedField SFVec3f     center           0 0 0    # (-inf,inf)
  exposedField MFNode      children         []
  exposedField SFRotation  rotation         0 0 1 0  # [-1,1],(-inf,inf)
  exposedField SFVec3f     scale            1 1 1    # (0,inf)
  exposedField SFRotation  scaleOrientation 0 0 1 0  # [-1,1],(-inf,inf)
  exposedField SFVec3f     translation      0 0 0    # (-inf,inf)
  field        SFVec3f     bboxCenter       0 0 0    # (-inf,inf)
  field        SFVec3f     bboxSize         -1 -1 -1 # (0,inf) or -1,-1,-1
}


Viewpoint {
  eventIn      SFBool     set_bind
  exposedField SFFloat    fieldOfView    0.785398  # (0,inf)
  exposedField SFBool     jump           TRUE
  exposedField SFRotation orientation    0 0 1 0   # [-1,1],(-inf,inf)
  exposedField SFVec3f    position       0 0 10    # (-inf,inf)
  field        SFString   description    ""
  eventOut     SFTime     bindTime
  eventOut     SFBool     isBound
}

VisibilitySensor {
  exposedField SFVec3f center   0 0 0      # (-inf,inf)
  exposedField SFBool  enabled  TRUE
  exposedField SFVec3f size     0 0 0      # [0,inf)
  eventOut     SFTime  enterTime
  eventOut     SFTime  exitTime
  eventOut     SFBool  isActive
}

WorldInfo {
  field MFString info  []
  field SFString title ""
}


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```