VRML 2.0 - Cheat Sheat - based on DIS 14772 Text - 14-FEB-97 jch@jch.com

Sensors

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
}
```

PlaneSensor{

```
 exposedField  SFBool      autoOffset       TRUE
 exposedField  SFBool      enabled          TRUE
 exposedField  SFVec2f     maxPosition      -1 -1
 exposedField  SFVec2f     minPosition      0 0
 exposedField  SFVec3f     offset           0 0 0
 eventOut      SFBool      isActive
 eventOut      SFVec3f     trackPoint_changed
 eventOut      SFVec3f     translation_changed
}
```

CylinderSensor{

```
 exposedField  SFBool      autoOffset       TRUE
 exposedField  SFFloat     diskAngle        0.262
 exposedField  SFBool      enabled          TRUE
 exposedField  SFFloat     maxAngle         -1
 exposedField  SFFloat     minAngle         0
 exposedField  SFFloat     offset           0
 eventOut      SFBool      isActive
 eventOut      SFRotation  rotation_changed
 eventOut      SFVec3f     trackPoint_changed
}
```

SphereSensor{

```
 exposedField  SFBool      autoOffset       TRUE
 exposedField  SFBool      enabled          TRUE
 exposedField  SFRotation  offset           0 1 0 0
 eventOut      SFBool      isActive
 eventOut      SFRotation  rotation_changed
 eventOut      SFVec3f     trackPoint_changed
}
```

ProximitySensor{

```
 exposedField  SFVec3f     center           0 0 0
 exposedField  SFVec3f     size             0 0 0
 exposedField  SFBool      enabled          TRUE
 eventOut      SFBool      isActive
 eventOut      SFVec3f     position_changed
 eventOut      SFRotation  orientation_changed
 eventOut      SFTime      enterTime
 eventOut      SFTime      exitTime
}
```

VisibilitySensor{

```
 exposedField  SFVec3f     center           0 0 0
 exposedField  SFBool      enabled          TRUE
 exposedField  SFVec3f     size             0 0 0
 eventOut      SFTime      enterTime
 eventOut      SFTime      exitTime
 eventOut      SFBool      isActive
}
```

* Collision{} also acts as a sensor

TimeSensor{

```
 exposedField  SFTime      cycleInterval    1
 exposedField  SFBool      enabled          TRUE
 exposedField  SFBool      loop             FALSE
 exposedField  SFTime      startTime        0
 exposedField  SFTime      stopTime         0
 eventOut      SFTime      cycleTime
 eventOut      SFFloat     fraction_changed
 eventOut      SFBool      isActive
 eventOut      SFTime      time
}
```

Interpolators

ColorInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFColor     keyValue         []
 eventOut      SFColor     value_changed
}
```

CoordinateInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFVec3f     keyValue         []
 eventOut      MFVec3f     value_changed
}
```

NormalInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFVec3f     keyValue         []
 eventOut      MFVec3f     value_changed
}
```

OrientationInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFRotation  keyValue         []
 eventOut      SFRotation  value_changed
}
```

PositionInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFVec3f     keyValue         []
 eventOut      SFVec3f     value_changed
}
```

ScalarInterpolator{

```
 eventIn       SFFloat     set_fraction
 exposedField  MFFloat     key              []
 exposedField  MFFloat     keyValue         []
 eventOut      SFFloat     value_changed
}
```

Transform and Special Groups

Transform{

```
 eventIn       MFNode      addChildren
 eventIn       MFNode      removeChildren
 exposedField  SFVec3f     center           0 0 0
 exposedField  MFNode      children         []
 exposedField  SFRotation  rotation         0 0 1 0
 exposedField  SFVec3f     scale            1 1 1
 exposedField  SFRotation  scaleOrientation 0 0 1 0
 exposedField  SFVec3f     translation      0 0 0
 field         SFVec3f     bboxCenter       0 0 0
 field         SFVec3f     bboxSize         -1 -1 -1
}
```

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
 field         SFVec3f     bboxSize         -1 -1 -1
}
```

Inline{

```
 exposedField  MFString    url              []
 field         SFVec3f     bboxCenter       0 0 0
 field         SFVec3f     bboxSize         -1 -1 -1
}
```

Group{

```
 eventIn       MFNode      addChildren
 eventIn       MFNode      removeChildren
 exposedField  MFNode      children         []
 field         SFVec3f     bboxCenter       0 0 0
 field         SFVec3f     bboxSize         -1 -1 -1
}
```

Billboard{

```
 eventIn       MFNode      addChildren
 eventIn       MFNode      removeChildren
 exposedField  SFVec3f     axisOfRotation   0 1 0
 exposedField  MFNode      children         []
 field         SFVec3f     bboxCenter       0 0 0
 field         SFVec3f     bboxSize         -1 -1 -1
}
```

Collision{

```
 eventIn       MFNode      addChildren
 eventIn       MFNode      removeChildren
 exposedField  MFNode      children         []
 exposedField  SFBool      collide          TRUE
 field         SFVec3f     bboxCenter       0 0 0
 field         SFVec3f     bboxSize         -1 -1 -1
 field         SFNode      proxy            NULL
 eventOut      SFTime      collideTime
}
```

LOD{

```
 exposedField  MFNode      level            []
 field         SFVec3f     center           0 0 0
 field         MFFloat     range            []
}
```

Switch{

```
 exposedField  MFNode      choice           []
 exposedField  SFInt32     whichChoice      -1
}
```

Script

Script{

```
 exposedField  MFString    url              []
 field         SFBool      directOutput     FALSE
 field         SFBool      mustEvaluate     FALSE
 # And any numberof:
 eventIn       eventTypeName  eventName
 field         fieldTypeName  fieldName   initialValue
 eventOut      eventTypeName  eventName
}
```

Browser Interface

```
# these get called automagically, if they exist.

initialize();
shutdown();
eventsProcessed();

# for example myString = Browser.getName();

SFString getName( );
SFString getVersion( );
SFFloat getCurrentSpeed( );
SFFloat getCurrentFrameRate( );
SFString getWorldURL( );
void replaceWorld( MFNode nodes );
void loadURL( MFString url, MFString parameter );
void setDescription( SFString description );
MFNode createVrmlFromString( SFString vrmlSyntax );
void createVrmlFromURL( MFString url, SFNode node,
                           SFString event );
void addRoute( SFNode fromNode, SFString fromEventOut,
               SFNode toNode, SFString toEventIn );
void deleteRoute( SFNode fromNode, SFString fromEvent,
                  SFNode toNode, SFString toEventIn );
```

Bindables

Viewpoint{

```
 eventIn       SFBool      set_bind
 exposedField  SFFloat     fieldOfView      0.785398
 exposedField  SFBool      jump             TRUE
 exposedField  SFRotation  orientation      0 0 1 0
 exposedField  SFVec3f     position         0 0 1 0
 field         SFString    description      “”
 eventOut      SFTime      bindTime
 eventOut      SFBool      isBound
}
```

Background{

```
 eventIn       SFBool      set_bind
 exposedField  MFFloat     groundAngle      []
 exposedfield  MFColor     groundColor      []
 exposedField  MFString    backUrl          []
 exposedField  MFString    bottomUrl        []
 exposedField  MFString    frontUrl         []
 exposedField  MFString    leftUrl          []
 exposedField  MFString    rightUrl         []
 exposedField  MFString    topUrl           []
 exposedField  MFFloat     skyAngle         []
 exposedField  MFColor     skyColor         [0 0 0]
 eventOut      SFBool      isBound
}
```

Fog{

```
 exposedField  SFColor     color            1 1 1
 exposedField  SFString    fogType          “LINEAR”
 exposedField  SFFloat     visibilityRange  0
 eventIn       SFBool      set_bind
 eventOut      SFBool      isBound
}
```

NavigationInfo{

```
 eventIn       SFBool      set_bind
 exposedField  MFFloat     avatarSize [0.25, 1.6, 0.75]
 exposedField  SFBool      headlight        TRUE
 exposedField  SFFloat     speed            1.0
 exposedField  MFString    type             “WALK”*
 exposedField  SFFloat     visibilityLimit  0.0
 eventOut      SFBool      isBound
}
```

* other values are “EXAMINE”, “FLY”, and “NONE”

Lights

DirectionalLight{

```
 exposedField  SFFloat     ambientIntensity 0
 exposedField  SFColor     color            1 1 1
 exposedField  SFVec3f     direction        0 0 -1
 exposedField  SFFloat     intensity        1
 exposedField  SFBool      on               TRUE
}
```

PointLight{

```
 exposedField  SFFloat     ambientIntensity 0
 exposedField  SFVec3f     attenuation      1 0 0
 exposedField  SFColor     color            1 1 1
 exposedField  SFFloat     intensity        1
 exposedField  SFVec3f     location         0 0 0
 exposedField  SFBool      on               TRUE
 exposedField  SFFloat     radius           1 0 0
}
```

SpotLight{

```
 exposedField  SFFloat     ambientIntensity 0
 exposedField  SFVec3f     attenuation      1 0 0
 exposedField  SFFloat     beamWidth        1.570796
 exposedField  SFColor     color            1 1 1
 exposedField  SFFloat     cutOffAngle      0.785398
 exposedField  SFVec3f     direction        0 0 -1
 exposedField  SFFloat     intensity        1
 exposedField  SFVec3f     location         0 0 0
 exposedField  SFBool      on               TRUE
 exposedField  SFFloat     radius           1 0 0
}
```

WorldInfo

WorldInfo{

```
 field         MFString    info             []
 field         SFString    title            “”
}
```

```
# Metadata generated by
# http://vancouver-webpages.com/VWbot/mk-metas.html
WorldInfo {
 info [
 “Title = VRML 2.0 Cheat Sheet”,
 “Subject = This is the Subject”,
 “Author = YON - Jan C. Hardenbergh”,
 “Publisher = Golden Age Publishing”,
 “VW96.ObjectType = World”,
  “SCHEMA.VW96  =  http://vancouver-webpages.com/VWbot/
VW96-schema.html”,
 “Form = VRML2.0”,
 “HTTP.date = Tue, 04 Feb 1997 01:09:29 GMT”
“Copyright 1997 jch@jch.com, permission to use granted
on condition that copyright is maintained.”
 ]
 title “VRML 2.0 Cheat Sheet”
}
```

Shape & Appearance

```
Shape{
 exposedField  SFNode      appearance       NULL
 exposedField  SFNode      geometry         NULL
}
```

```
Appearance{
 exposedField  SFNode      material         NULL
 exposedField  SFNode      texture          NULL
 exposedField  SFNode      textureTransform NULL
}
```

```
Material{
 exposedField  SFFloat     ambientIntensity 0.2
 exposedField  SFColor     diffuseColor     0.8 0.8 0.8
 exposedField  SFColor     emissiveColor    0 0 0
 exposedField  SFFloat     shininess        0.2
 exposedField  SFColor     specularColor    0 0 0
 exposedField  SFFloat     transparency     0
}
```

```
TextureTransform{
 exposedField  SFVec2f     center           0 0
 exposedField  SFFloat     rotation         0
 exposedField  SFVec2f     scale            1 1
 exposedField  SFVec2f     translation      0 0
}
```

Textures a.k.a Images

```
PixelTexture{
 exposedField  SFImage     image            0 0 0
 field         SFBool      repeatS          TRUE
 field         SFBool      repeatT          TRUE
}
```

```
ImageTexture{
 exposedField  MFString    url              []
 field         SFBool      repeatS          TRUE
 field         SFBool      repeatT          TRUE
}
```

```
MovieTexture{
 exposedField  SFBool      loop             FALSE
 exposedField  SFFloat     speed            1.0
 exposedField  SFTime      startTime        0
 exposedField  SFTime      stopTime         0
 exposedField  MFString    url              []
 field         SFBool      repeatS          TRUE
 field         SFBool      repeatT          TRUE
 eventOut      SFTime      duration_changed
 eventOut      SFBool      isActive
}
```

Other Syntax Elements

DEF/USE

DEF *defname* **Node {...}**

USE *defname # anywhere a Node {} can be used*

Routes

ROUTE *defname.eventOut* **TO** *defname.eventIn*

Prototypes

```
PROTO     prototypename[
 eventIn       fieldtype   name
 eventOut      fieldtype   name
 exposedField  fieldtype   name    defaultValue
 field         fieldtype   name    defaultValue
 ...           ]
{
 Zero or more PROTO or EXTERNPROTO statements
 First node (defines the node type of this prototype)
 Zero or more nodes (of any type), routes,
              and prototypes
}
```

```
EXTERNPROTO externprototypename[
 eventIn       eventtype   name
 eventOut      eventtype   name
 field         fieldtype   name
 exposedField  fieldtype   name
 ...           ]
 “URL/URN” or [ “URL/URN”, “URL/URN”, ... ]
```

URN example “urn:inet:vag.vrml.org:textures/wood1”

MIME Type

model/vrml   *(or x-world/x-vrml)*

Geometry

```
Box{
 field         SFVec3f     size             2 2 2
}
```

```
Cone{
 field         SFFloat     bottomRadius     1
 field         SFFloat     height           2
 field         SFBool      side             TRUE
 field         SFBool      bottom           TRUE
}
```

```
Cylinder{
 field         SFBool      bottom           TRUE
 field         SFFloat     height           2
 field         SFFloat     radius           1
 field         SFBool      side             TRUE
 field         SFBool      top              TRUE
}
```

```
Sphere{
 field         SFFloat     radius           1
}
```

```
PointSet{                              # 0D
 exposedField  SFNode      color            NULL
 exposedField  SFNode      coord            NULL
}
```

```
IndexedLineSet{                        # 1D
 eventIn       MFInt32     set_colorIndex
 eventIn       MFInt32     set_coordIndex
 exposedField  SFNode      color            NULL
 exposedField  SFNode      coord            NULL
 field         MFInt32     colorIndex       []
 field         SFBool      colorPerVertex   TRUE
 field         MFInt32     coordIndex       []
}
```

```
IndexedFaceSet{                        # 2D
 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       []
 field         SFBool      colorPerVertex   TRUE
 field         SFBool      convex           TRUE
 field         MFInt32     coordIndex       []
 field         SFFloat     creaseAngle      0
 field         MFInt32     normalIndex      []
 field         SFBool      normalPerVertex  TRUE
 field         SFBool      solid            TRUE
 field         MFInt32     texCoordIndex    []
}
```

```
ElevationGrid{
 eventIn       MFFloat     set_height
 exposedField  SFNode      color            NULL
 exposedField  SFNode      normal           NULL
 exposedField  SFNode      texCoord         NULL
 field         MFFloat     height           []
 field         SFBool      ccw              TRUE
 field         SFBool      colorPerVertex   TRUE
 field         SFFloat     creaseAngle      0
 field         SFBool      normalPerVertex  TRUE
 field         SFBool      solid            TRUE
 field         SFInt32     xDimension       0
 field         SFFloat     xSpacing         1.0
 field         SFInt32     zDimension       0
 field         SFFloat     zSpacing         1.0
}
```

```
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
 field         MFVec2f     crossSection
                            [1 1, 1 -1,-1 -1,-1 1, 1 1]
 field         SFBool      endCap           TRUE
 field         MFRotation  orientation      0 0 1 0
 field         MFVec2f     scale            1 1
 field         SFBool      solid            TRUE
 field         MFVec3f     spine        [0 0 0, 0 1 0]
}
```

Geometry SubNodes

```
Coordinate{
 exposedField  MFVec3f     point            []
}
```

```
Normal{
 exposedField  MFVec3f     vector           []
}
```

```
Color{
 exposedField  MFColor     color            []
}
```

```
TextureCoordinate{
 exposedField  MFVec2f     point            []
}
```

Sound

```
Sound{
 exposedField  SFVec3f     direction        0 0 1
 exposedField  SFFloat     intensity        1
 exposedField  SFVec3f     location         0 0 0
 exposedField  SFFloat     maxBack          1 0
 exposedField  SFFloat     maxFront         1 0
 exposedField  SFFloat     minBack          1
 exposedField  SFFloat     minFront         1
 exposedField  SFFloat     priority         0
 exposedField  SFNode      source           NULL
 field         SFBool      spatialize       TRUE
}
```

```
AudioClip{                                   #sound source
 exposedField  SFString    description      “”
 exposedField  SFBool      loop             FALSE
 exposedField  SFFloat     pitch            1.0
 exposedField  SFTime      startTime        0
 exposedField  SFTime      stopTime         0
 exposedField  MFString    url              []
 eventOut      SFTime      duration_changed
 eventOut      SFBool      isActive
}
```

Text

```
Text{
 exposedField  MFString    string           []
 exposedField  SFNode      fontStyle        NULL
 exposedField  MFFloat     length           []
 exposedField  SFFloat     maxExtent        0.0
}
```

```
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
 field         SFFloat     spacing          1.0
 field         SFString    style            “PLAIN”
 field         SFBool      topToBottom      TRUE
}
```

```
family: “SERIF”, “SANS”, “TYPEWRITER”
style: “PLAIN”, “BOLD”, “ITALIC”, “BOLDITALIC”
language: refer to RFC 1766
justify: “FIRST”, “BEGIN”, “MIDDLE”, “END”
```