



# Orxonox

# Introduction to level design

P&S Orxonox HS16

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# Orxonox

**Level design = adding objects to a 3D scene**

- **Visible objects**
  - Models (Spaceships, Astroids, Spacestations,...)
  - Particle effects
  - Light
  - Sound
- **Invisible objects**
  - Quests/Missions
  - Waypoints for AI spaceships
  - Triggers & Events



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## .owx orxonox level file structure

```
1 <LevelInfo
2   name = "Empty level"
3   description = "A level with absolutely nothing in it"
4   tags = "test"
5   screenshot = "emptylevel.png"
6 />
7
8 <?lua
9   include("stats.oxo")
10  include("HUDTemplates3.oxo")
11  include("templates/lodInformation.oxt")
12 ?>
13
14 <?lua
15   include("templates/spaceshipEscort.oxt")
16 ?>
17
18 <Level>
19   <templates>
20     <Template link=lodtemplate_default />
21   </templates>
22   <?lua include("includes/notifications.oxi") ?>
23
24   <Scene
25     ambientlight = "0.8, 0.8, 0.8"
26     skybox       = "Orxonox/Starbox"
27   >
28
29
30
31   <Light type=directional position="0,0,0" direction="0.253, 0.593, -0.765" diffuse="1.0, 0.
32   <SpawnPoint team=0 position="-200,0,0" lookat="0,0,0" spawnclass=SpaceShip pawnDesign=spac
33
34
35
36
37 </Scene>
38 </Level>
39
40
```

Add level description here

Includes (e.g. space ship templates, HUDs, )

Spaceships, Portals, Light, Sound, Quests, AI controllers, ...



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## Adding a model to the scene

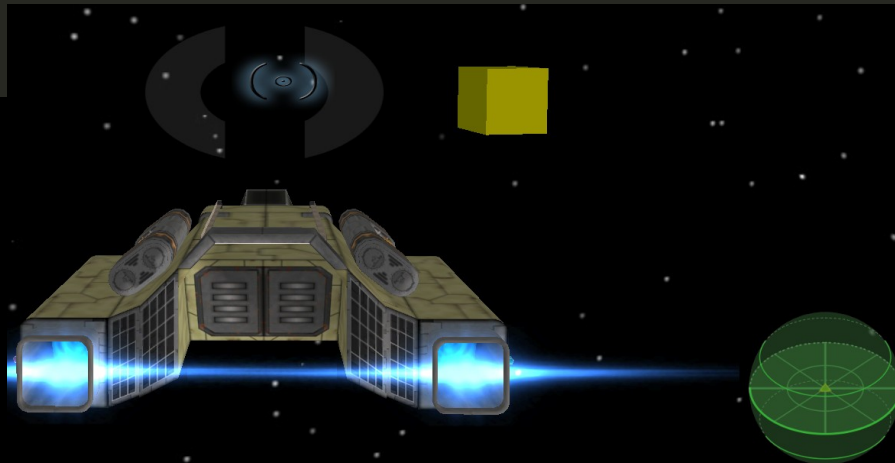
```
<Level>
  <templates>
    <Template link=lodtemplate_default />
  </templates>
  <?lua include("includes/notifications.oxi") ?>

  <Scene
    ambientlight = "0.8, 0.8, 0.8"
    skybox       = "Orxonox/Starbox"
  >

  <Light type=directional position="0,0,0" direction="0.253, 0.593, -0.765" diffuse="1.0, 0.9, 0.9, 1.0" specular="1.0, 0.9, 0.9, 1.0"/>
  <SpawnPoint team=0 position="-200,0,0" lookat="0,0,0" spawnclass=SpaceShip pawndesign=spaceshipescort />

  <Model mesh="cube.mesh" position="0,0,0" scale=10 />

</Scene>
</Level>
```





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## Collisionshapes

```
<Light type=directional position="0,0,0" direction="0.253, 0.593, -0.765" diffuse="1.0, 0.9, 0.9, 1.0" specular="1.0, 0.9, 0.9, 1.0"/>
<SpawnPoint team=0 position="-200,0,0" lookat="0,0,0" spawnclass=SpaceShip pawnDesign=spaceshipescort />

<StaticEntity position="0,-10000,0" direction="0,-1,0" collisionType=static mass=100000 friction=0.01 >
  <attached>
    <Model position="0,0,0" mesh="cube.mesh" scale3D="10000,10000,1000" />
  </attached>
  <collisionShapes>
    <BoxCollisionShape position="0,0,0" halfExtents="10000,10000,1000" />
  </collisionShapes>
</StaticEntity>
```

- A model is only visible. Nothing else!
- To get a solid object, you need to add a collision shape.
- Attach Model to StaticEntity
- Specify physics (mass, friction, ...) of StaticEntity



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## Other types of objects for level design

- Portals
- SpaceBoundaries
- Pickups
- Planets





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## AI Spaceship with WaypointPatrolController

```
<SpaceShip position="300,0,0" lookat="0,0,0" team=3>
  <templates>
    <Template link=spaceshipscort />
  </templates>
  <controller>
    <WaypointPatrolController accuracy=10 team=3>
      <waypoints>
        <Model mesh="cube.mesh" scale=8 position="300,0,0" />
        <Model mesh="cube.mesh" scale=8 position="300,500,0" />
        <Model mesh="cube.mesh" scale=8 position="0,500,0" />
        <StaticEntity position="0,0,0" />
      </waypoints>
    </WaypointPatrolController>
  </controller>
</SpaceShip>
```



- Controllers control (move, fire, boost, ...) ControllableEntities (e.g. SpaceShips)
- Specify waypoints for WaypointPatrolController
- More intelligent controllers for AI enemies available



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## Triggers & Events

```
<ParticleSystem position="0,0,0" source="Orxonox/bigexplosion" lifetime=3.5 loop=0 autostart=0>
  <events>
    <spawn>
      <EventListener event="spawnparticle" />
    </spawn>
  </events>
</ParticleSystem>
<DistanceTrigger name="spawnparticle" position="0,0,0" target="SpaceShip" distance=50 stayActive="true" />
```

- Dynamic levels. Level changes depending on player behaviour, time, ...
- Example: Particle effects runs if a SpaceShip triggers the DistanceTrigger
- Complicated combinations of triggers possible (e.g. run the particle effect only if trigger A was triggered first and the trigger B was triggered)





# Orxonox

[http://www.orxonox.net/wiki/PPS\\_main](http://www.orxonox.net/wiki/PPS_main)

## Important resources

Coding guides, help, documentation: [Coding](#) (read this!)  
Installing and building Orxonox: [LinuxTardis](#)

### Administrative Information

If you're a student at the ETH Zürich at the department ITET and you're in the 3rd to 6th semester, you can participate in our PPS. The Project is intended for students interested in game development or programming and modeling in general. Feel free to look around on our page to find something you're interested in.

## 3rd to 6th Semester

Facts about our PPS for the 3rd to 6th semester:

- You get **3KP**
- The PPS takes place on **Wednesdays 16:00**
- The PPS starts on **26th September**
- Room: ETZ D96

For more information feel free to contact the PPS leaders:

- Maxim Aebischer (maxima@...)
- Fabien Vultier (fvultier@...)
- Florian Zinggeler (zifloria@...)

## Timetable

Date	Room	Topic	Slides
26 sep	ETZ D96	Introduction and Tools (wiki, forum, svn and blender), <a href="#">Download the game</a> , <a href="#">Blender Tutorial</a>	<a href="#">Introduction</a> , <a href="#">Blender</a>
		Framework and coding tutorial and level design tutorial	<a href="#">Framework</a> , <a href="#">Handout</a>
10 oct	ETZ D 61.2	Choose the projects, start planning.	<a href="#">SVN</a> , <a href="#">SVN-Handout</a>
17 oct	ETZ D 61.2	Project Work	
24 oct	ETZ D 61.2	1st Review / Project Work	
31 oct	ETZ D 61.2	Project Work	