FCG Lab04: Assignment (Character animation with Blender)

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Abstract

Blender is a very complete and powerful software used to create 2D and 3D contents. It provides a wide range of graphical tools that enable the user to model and animate 3D objects in an efficient way. This assignment requires to create a character model able to move both legs and arms. All aesthetic improvements made to the scene and its visual rendering will be taken into account in the evaluation of the assignment.

Submission is suggested within 8:00 am, May 23rd, 2017. All the source files and a makefile (or compiling instructions) has to be sent by email with subject: *[FCG-assignment04] - Surname Name*, to m.savardi001@unibs.it.

Character modeling

Key terms: Mirror modifier, Loop cuts, Extrusion

In this part we are going to create the character model. It has to somehow resemble a human body, so it must have a head, two arms, two legs and of course a trunk. Since 3D modeling is an art, it is very difficult to create a realistic body, so we don't care how the character is "beautiful"; it has just to "work", you can do what you prefer.

We can create the character starting from the cube that appears has default in the Blender window. During this part it is really useful to enable the *mirror modifier*; by doing this we can focus to model just half of the body, the rest will be mirrored by Blender ensuring a perfect symmetry. So we can insert a *loop cut* in the middle of cube, deleting the most left/right vertices and enable the mirror modifier.

At this point we have to reshape the cube in order to better represent the torso. The remaining parts of the body: head, arm and legs can be created by *extrusion*. For doing this you can add other *loop cuts* to create the faces that represent starting points of the neck, arm and leg which will be extruded. Once the rough model is created you can start to give him a better looking by grabbing/scaling/rotating vertices and edge as you wish.
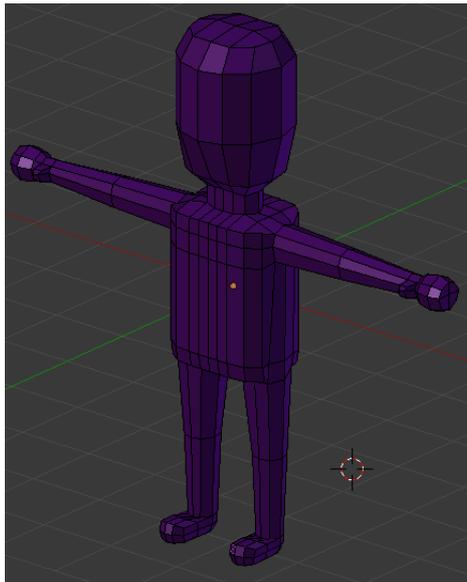

Figure 1: Character example

Skeleton creation

Key terms: Rigging, Skinning, Armature, Bones

In this section we are going to create the model skeleton. This will enable us to animate the model. Blender provides specific tools for doing this, in particular *armature*.

Armature

The model skeleton, like the humans one, is composed by bones. In Blender a skeleton is obtained by creating an armature by means of particular objects, surprisingly called *bones*.

Also in this case, it is useful to exploit mirroring effects while designing the armature. This can be done enabling the *x-axis mirror* in the armature

options. We can create the armature starting from the spine, so we place a bone that can be subdivided in 2 parts inside the trunk of the model [1]. At this point the remaining parts of the skeleton are created by extruding new bones from parent's bone tip, and placing them in the correspondent positions within the model.
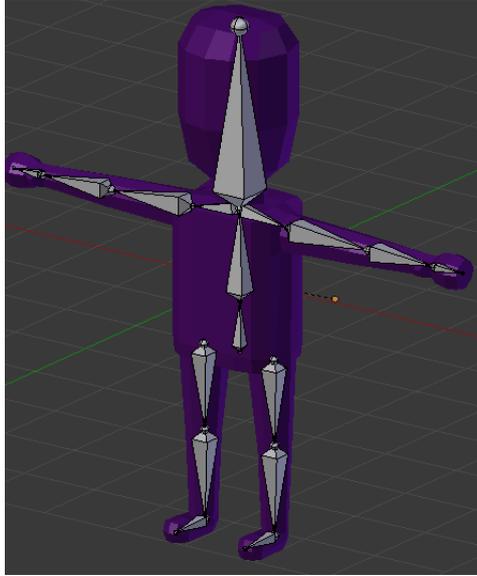

Figure 2: Armature example

Skinning and Posing

At this point we have the model and its skeleton, but they are not connected: transformations of the bones pose doesn't affect the correspondent model part. The operation of grouping model and its skeleton is called *skinning* and is really easy: just select the model and the skeleton then type ctrl-p and chose: set parent with automatic weights. Now in *pose-mode* we can notice that changing bone pose affects also the model.

Animation

Key terms: Dope sheet, Animation editor, Key frames

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[1]In order to see bones inside the model, *X-ray* options must be enabled in the armature panel.
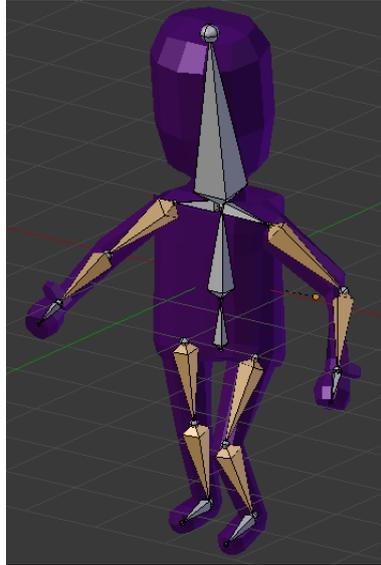
Figure 3: Pose example

So far we have created a model; now we want to make a walk anima-
tion. Also in this case Blender comes with all the necessary tools that can
be reached selecting the animation view. Animation is based on key-frames:
these special kind of objects store all the information related to the arma-
ture configurations (bones positions, etc.). A user creates an animation by
defining some key-frames, where each keyframe represents the model in a
particular pose. Animation effect is obtained by automatic interpolation
between key-frames.

Bonus

For those of you who want to explore more deeply this topic I suggest you to

- make the model more similar to a human body;

- make the movement of the body as natural as possible;

- apply different textures to various parts of the body.

Online resources in Italian

- Le basi per principianti assoluti by Francesco Milanese (3 videos)
  https://www.youtube.com/watch?v=qWSGwwrRwCk

- Corso di base by Francesco Milanese (80 videos)
  https://www.youtube.com/playlist?list=PL96CA8E87CC4F7E0F