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 **High end to realtime**

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 02-10-2007, 02:20 AM

#1 

[Wasamonkey](#) 

Nathan Hauck



Join Date: Mar 2006
Posts: 187

 **High end to realtime**

Hello to everyone on the forum.

Please bare with me as sometimes I have trouble putting things into words that can be understood. Feel free to offer suggestions to reword things or request additional images to help explain things.

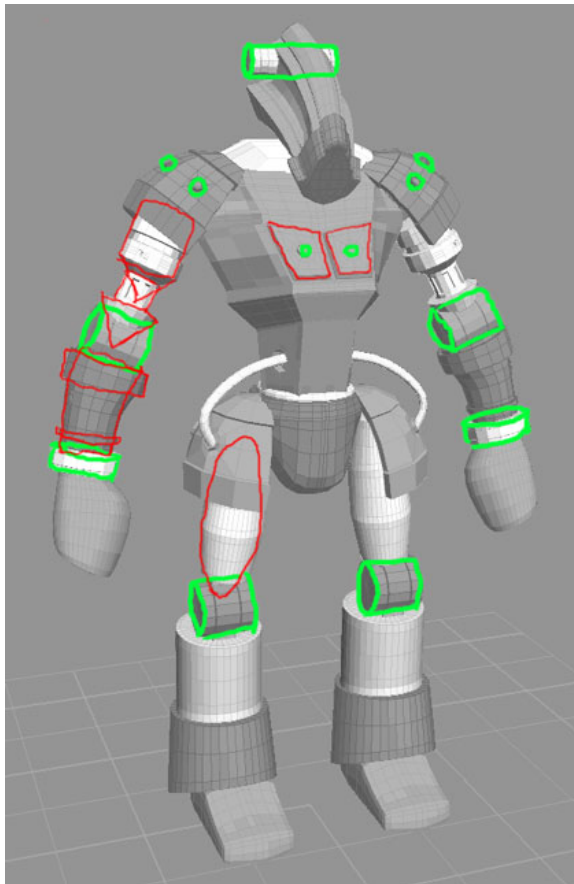
I'd just like to take a moment to thank Adam and Wayne for giving me the opportunity to give back to one of my favorite sites on the web. And i would like to thank all the writers of the tutorials I read on this subject some years ago.

Let's get started with the basics and move into the more complex things as we go. There are 2 different types of models sectional and single mesh.

Sectional uses at least separate pieces for each part. This makes it so we don't have to worry about animation as much. But in general require more geometry to keep the shape from falling apart

Single mesh is not always that, but is typically used for organic models like monsters and humans, like in the case of quake3 the model can have sections, as it still falls closely to the rules of a single mesh. It's much easier to get the detail down on these since alot of detail can be carried over by normal maps. But animation and UVs should always be kept in mind while working. Quickly these models can become difficult to UV or animate poorly. I'll be covering some animation tricks that allow very low res models that deform Automagicy. (c)

First things first, here we have Wayne's robot model for use in the robot challenge. Before we do anything else we need to identify the basic shapes.



As you can see there are several basic shapes, but we don't want to spend time remodeling the whole thing, so let's just concentrate on the ones I highlighted in green. We will get to the ones in red when we get into some of the later tricks of the trade.

Rule 1

- Odd sided cylinders work better for tubes and any other round object that you won't see the ends of.
- 3 sides for very small things, 5 for medium, 7 for large and 9-15 for cylinders that show the end caps.
- Odd sided objects don't get that squash stretch effect when they rotate like even sided do.
- They will however wobble but this is something to only worry about when doing tires or other such things.

Since we have 4 large and one medium that are highly visible from most angles we will want to step them up to the next level. So what would be 5 sided becomes 7 sided, and what would be 7 becomes 9 or 11. Go for what's visually pleasing as long as it fits in your budget.

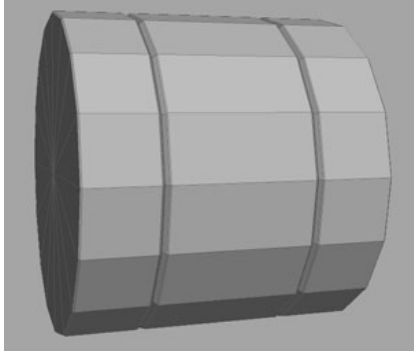
Speaking of which, we have yet to discuss our budget. For this our budget will be 3000 tris to start, then we will decrease our budget to 2000 and finally we will just squeeze the sucker down below 1000. How far below, we will just have to find out.

Since we can simply do the math for the cylinders we don't actually have to replace them yet. This will save us time later if we are over our count, or can spend a few extra to get a nice smooth look. Now I didn't mention the other 2 cylinders that I highlighted these are the ones at the wrist because of the sides being covered and them being at an angle where the radial is not highly visible from other angles we can actually get away with making them medium or at least the in between of 6 sided.

[for you geometry geeks like me, the minimum enclosed 3d object is 4 sided with 4 verts
for every vert you add to this or any other model, you increase by 2 in faces
the formula is $f = v * 2 - 4$
this will help on enclosed models, that have not been triangulated as you can do this in your head very quickly

2890 vertices = $5780 - 4 = 5776$ faces (we don't really need to worry about calculating the -4 difference)
 now if you have holes this will not be accurate, but we can still use it as a guide to judge how we are doing]

Let's take a closer look at these cylinders that wayne constructed.

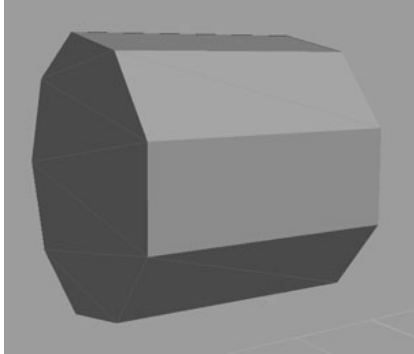


We have some nice little cuts here that probably won't show up in most cases. These are the things that bump and normal maps are great for, small details, but we aren't doing normal maps in this thread so I'll show you something else you can do instead. Before based on the guide rules these would be 9-11 sided.

$9 \times 4 - 4 = 32$ for 9 sided

$11 \times 4 - 4 = 40$ for 11 sided

We can see how quickly the number jumps for such a small value change. So only use what you need. But it wouldn't be any fun if we couldn't squeeze as much detail out of the model at the same time.

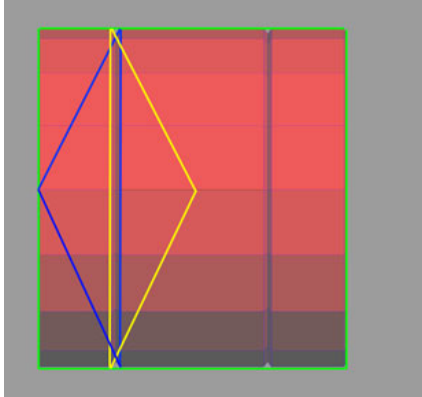


$9 \times 16 - 4 = 140$

$11 \times 16 - 4 = 172$

So how can we squeeze this down any further without dropping below 9 sides?

Lets find our basic shapes.

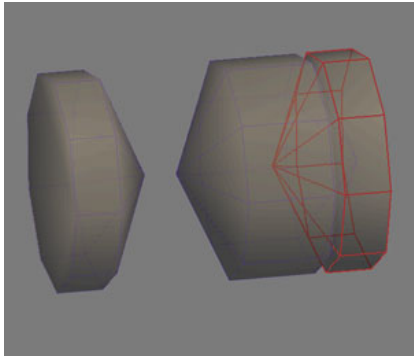


The overall is a cylinder

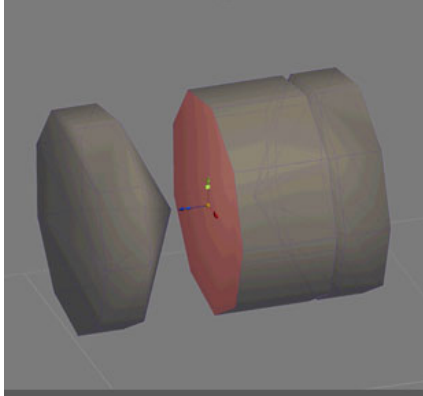
The two cuts are each 2 cones turned into one another

There are three ways to go if we want to keep this detail

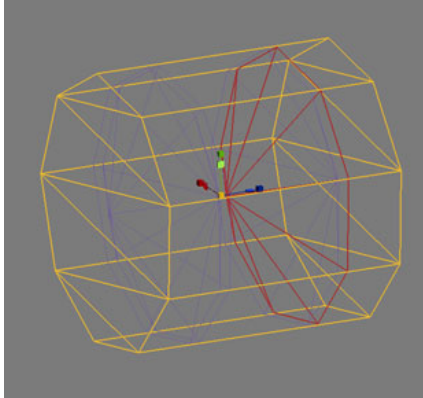
The logical way, make 3 pieces each with a coned end 104 tris



The methodical way two pieces with cones on the end 100 tris



Or the extreme way with 4 cones and one cylinder 68 tris



don't forget, just because you can see it doesn't mean that the user can see it

alpha maps are a great way to add detail at low costs

as for using, all of these would be done with projection uv from a single side and caps would be separate
texturing may include lighting depending on the game engine

I think that will wrap it up for today
Installments should be every week or 2

cheers

Last edited by Wasamonkey : 02-10-2007 at 02:24 AM.

QUOTE

QUICK

02-10-2007, 08:42 AM

#2



fktt
BlenderHead!



Join Date: Oct 2006
Location: Tallinn, Estonia
Posts: 742



ooh, nice, thanks for sharing! 🍷

-felix kütt. 😞 *so much to learn, so little time!* 😞

[QUOTE](#)[QUICK](#)

02-10-2007, 10:32 AM

#3



Adam
Super Moderator



Join Date: Jan 2006
Location: Going up Camborne Hill, coming down!
Posts: 1,251
● ● ●



Cool explanation Wasa. Thanks.

Adam

[QUOTE](#)[QUICK](#)

02-10-2007, 06:10 PM

#4

Wasamonkey
Nathan Hauck



Join Date: Mar 2006
Posts: 187



ah good, i was worried it was a bit too wordy
from here out tho, since i think i've pretty well shown and explained finding shapes, the rest will show actual reduction
process with multiple screens grouped to show progress, and try to explain why i did this and that
and try to explain some alternate methods and explain why i didn't use them
but i do plan to continue to stress the basics of finding the shapes
which is key to 90% of sectional models
then it's on to the single mesh which will stress silhouette and animation

cheers

oh, also if anyone would like to donate models for this thread
i can't promise it will be used but it would definately help and there is a chance of it getting used
or some part of it, since i'll want to use parts or all to show specific examples of cases

Last edited by Wasamonkey : 02-10-2007 at 06:19 PM.

[QUOTE](#)[QUICK](#)

02-10-2007, 09:29 PM

#5



Wayne
SDM User



Join Date: May 2006
Location: Durham, England
Posts: 1,284



A consise explantion is always a good thing. So its not too workdy at all. 😊

I'll have a look aorund my drive to see what I have that may be of use. What srt of polycount range are you looking for?

Wayne...

[Homepage](#)

[QUOTE](#)[QUICK](#)

02-11-2007, 12:57 AM

#6

Wasamonkey
Nathan Hauck



Join Date: Mar 2006
Posts: 187



well, i dont want something so dense that i'll spend an hour just deleting all the subd stuff 😊
but i could use another sectional model that is a bit different in shapes, like maybe something like a robot with a streamlined look or a car or something
then on the single mesh probably one humanoid and one quadruped, and or an insect or something totally wild and crazy

the more fun it is to work on the mesh, the more fun i'll have doing this guide 😊

cheers

[QUOTE](#)[QUICK](#)

02-21-2007, 03:30 AM

#7

Wasamonkey

Nathan Hauck



Join Date: Mar 2006
Posts: 187



Ah finally a short break from work. Actually I'm at work this moment 😞

Ok so last time we talked about identifying shapes. This time we are going to talk about the pitfalls of extrudes.

Everytime you extrude a detail your waisting polygons.

We are'nt talking about extrudes to make limbs and such so don't get confused. 😊

Here is an example of an extruded detail on Wayne's robot
(picture to come)

This cross needs additional detail to hold its odd shape.

If we extract or chipp off or copy this part of the detail into it's own part

Then reduce and fill the mesh behind like so.

(picture to come)

We have effectively reduced the poly count while retaining this detail.

Next we have the short cylinders on the forearm.

(picture to come)

While the cross could have worked as a normal map, these would break into the silhouette to much.

Still we have the same case of additional detail to hold the form

But because of the shaple of these, this goes beyond just increasing detail on one side to hold shape.

(picture to come)

By seperating and filling in the cylinders with a zigzag pattern we rid ourselves of the faces that would be needed all around. And we don't really have a need for a vert in the center which actually adds 2 faces

(pictures to come)

As for the arm that the details are on.

(pictures to come)

Basicly any object that extrudes out of another is one that should be made separate.

This also lends it's self very well to modeling additional things like back packs ammo clips or any other accessory. Don't forget to remove faces that are hidden if the item doesn't come off.

Ah and here we are at the end of another session.

I hope to have time to get the images together this evening.

Edit: sorry, forgot my drive at work so i had nothing to work on at home and had no way to bring it today if I even created some examples from scratch

7 days a week with only 1 day that's less than 9 hrs, it takes it's toll

tomorrow i have to take off for my own sanity, and for the free time to create the images without a clock ticking away, so Mar 4th -6 GMT I should have all the images ready

and will host them to start so we don't have to wait for Adam to get back to me right away

cheers and sorry again for the small delay

In the mouth of madness, turds taste like chocolate.

You can test this if you like.

Last edited by Wasamonkey : 03-03-2007 at 03:47 AM.

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