

First Person Shooter Game

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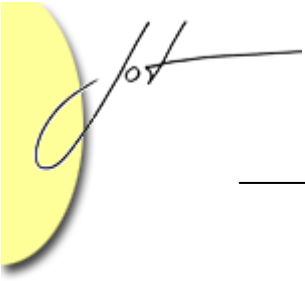
Abstract

3D game development is an exciting activity for many students. But getting a handle on 3D game development for novices may be a daunting task. We take this opportunity to present a quick introduction to 3D game development through a few tutorials. For the next few columns a set of tutorials for a 3D first person shooter game developed by graduate and undergraduate students under the guidance of a faculty member from the University of West Florida will be presented. These tutorials were developed with **3D game Studio** by *Conitec*. To follow along, download the software from www.conitec.com. These tutorials include all elements of game development such as modeling and animation, lighting, collision detection, sound and scripting. Each tutorial will focus on one or more of these aspects. This week we start out with creating a room and adding some objects to the room. The instructions for this are presented below.

1 GETTING TO KNOW YOUR MODEL EDITOR: MEDDLING WITH MED

A three-dimensional model is an object consisting of vertices, edges, and polygons. It is then textured, manipulated, and animated in order to bring the model to life. Once this is performed, then the model can be included into games as a character.

Every decent model editor supplies functionality to create models, perform animations, and specify textures for the polygons of the model. The only real difference between them is additional features. Only once model editing becomes a second nature to



someone should they begin to worry about the additional features that can be used for model creation. Until that time, stick with the basics.

This paper is a synopsis of the toolbars in MED followed by a short glossary of terms used in the modeling process. Additional features of MED will be explored in later tutorials but one should become well accustomed to the layout of the development area before diving into other aspects. Once this has occurred, then this paper can be used as a small reference during development of more intricate natures.

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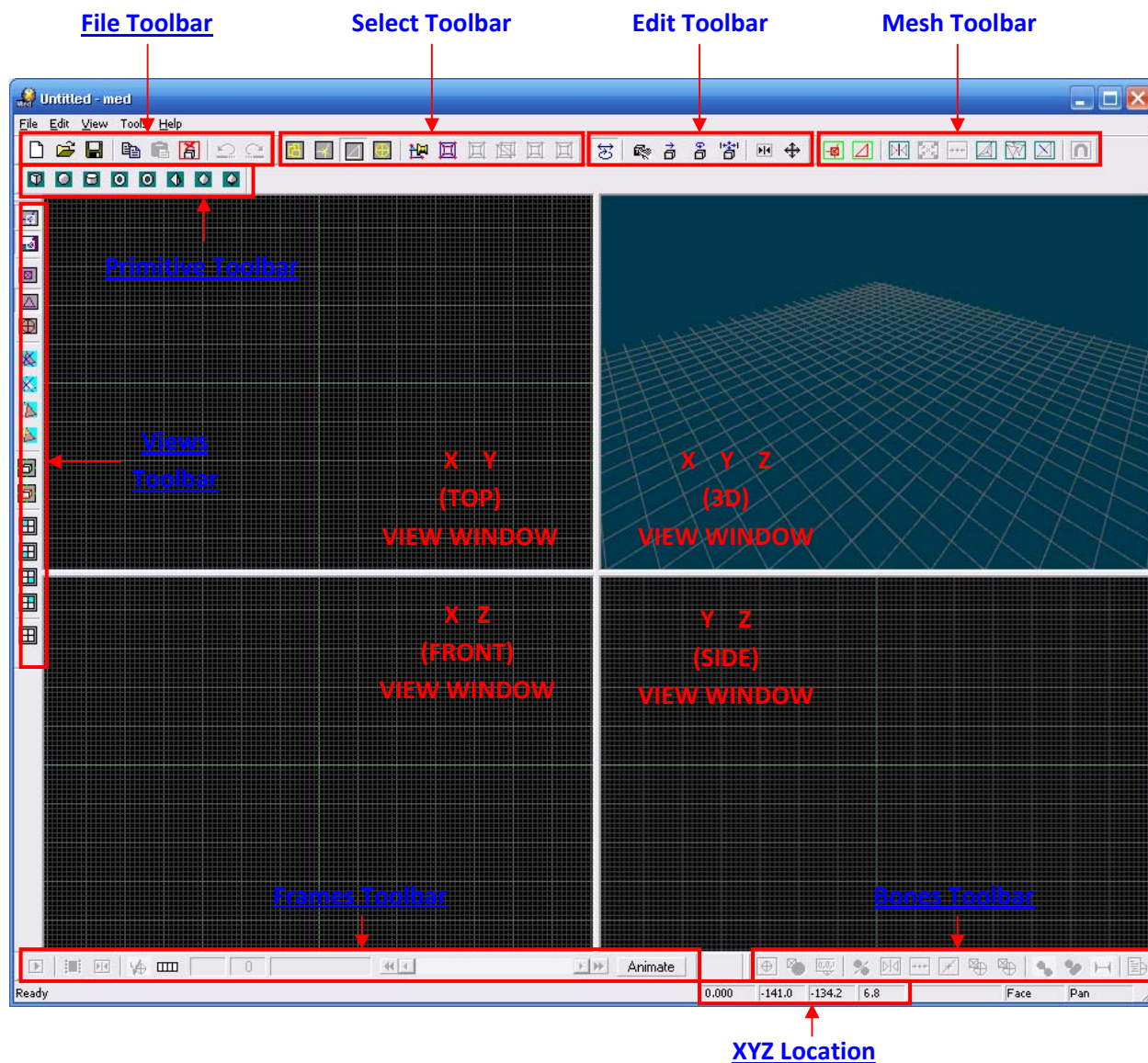
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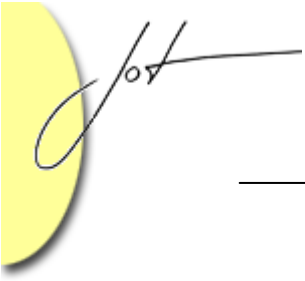


1. Default Layout of MED



The MED Default Layout is comprised of all toolbars and every view displayed with equal size. This is the format that likely will be used the most often. Each of the view displays presented have a specific camera in which to look at the model during the development process. As you can see in the image above, the displays focus on particular axes. The TOP, FRONT, and SIDE views display a 2-dimensional view of the object. This allows for precise placement of vertices and edges without distortion from the third dimension. The 3-dimensional view however displays the model with all three axes and allows for more control of viewing the model (zooming, rotating, etc) that are not capable in the other views.

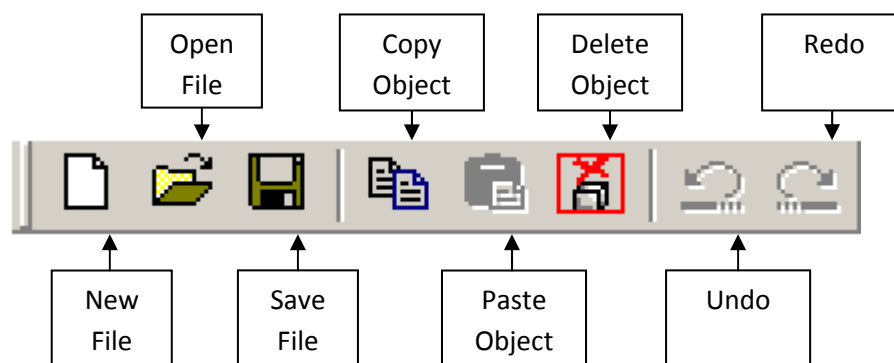
The toolbars (all toolbars are enabled by default) allow easy access to create and manipulate objects. Not every function in MED is accessible via the toolbars, but the more commonly



used functions are. Keep in mind that not all modeling programs are organized in this fashion, but once you understand what you need it will be just a matter of locating the function needed to get the job done.

2. File Toolbar

The File Toolbar provides quick access to all of the usual functions needed for dealing with object states



New File: Clears environment to allow for creation of a new model

Open File: Clears environment and loads the data held in a model file

Save File: Saves the present model state to a file

Copy Object: Copies the selected object to the clipboard

Paste Object: Creates a new instance of the previously copied object in the environment

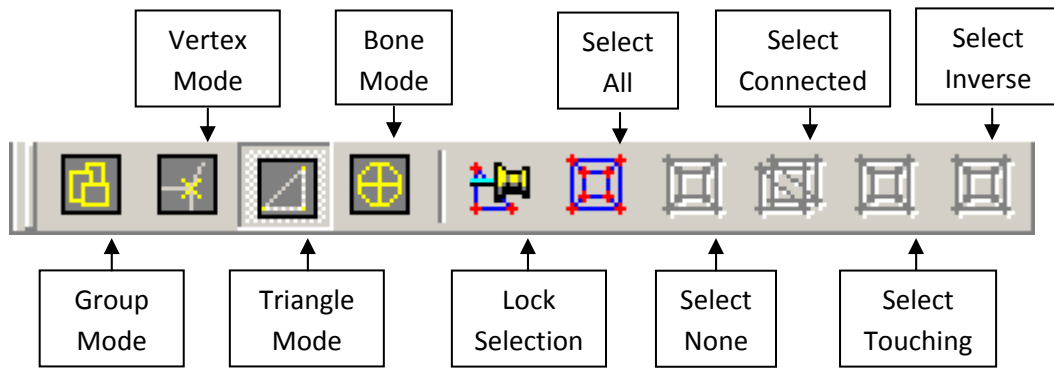
Delete Object: Removes the selected object from the environment

Undo Action: Reverts the model state to the previous state

Redo Action: Reverts the model to the next model state (Only for use after using “Undo Action”)

3. Select Toolbar

The Select Toolbar is used for selection of objects or portions of objects so that actions will be only applied to what is selected



Group Mode: Used for selecting entire groups (or objects) within the environment

Vertex Mode: Used for selecting vertices within the environment

Triangle Mode: Used for selecting faces of objects

Bone Mode: Used for selecting model bones

Lock Selection: Functions as a toggle switch (on/off switch). Used for maintaining a selection so that it cannot be altered while the button is depressed. This means that the selection cannot be added to or deselected until the button is pressed once more

Select All: Selects everything in the environment

Select None: Deselects everything that was selected

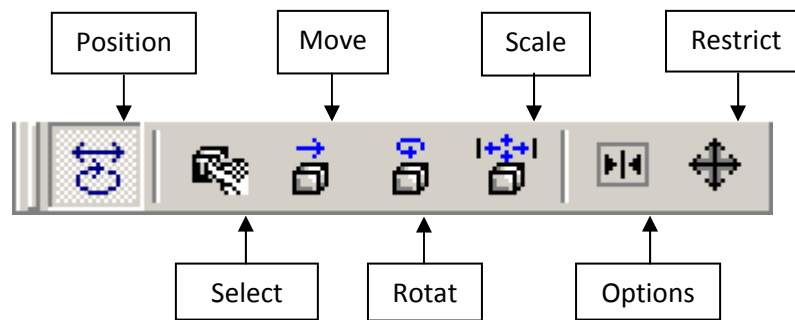
Select Connected: Selects everything that is connected to the selection

Select Touching: Selects all points or areas that are adjacently connected to the selection

Select Inverse: Selects everything and deselects what was previously selected

4. Edit Toolbar

The Edit Toolbar is used to make basic changes to a selection in addition to other things



Position: Used to move the display. It does not alter the current selection (moving the view does not deselect the current selected items)

Select: Used to select items

Move: Used to move items

Rotate: Used to turn items

Scale: Used to resize items

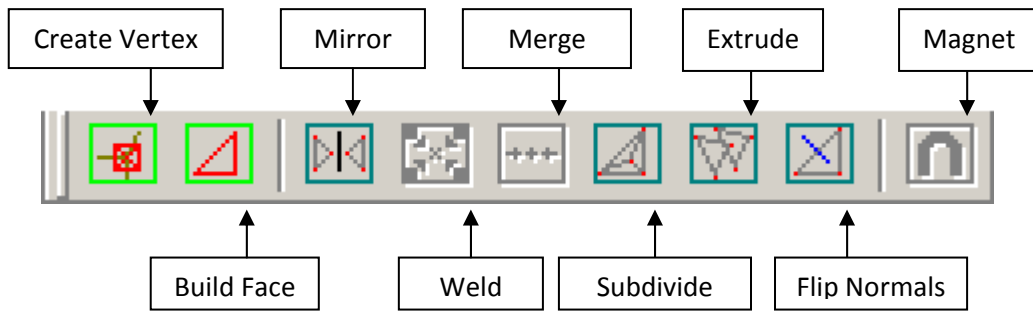
Options: Used to adjust environment interaction properties

Restrict: Used to add restrictions on how to move or scale items



5. Mesh Toolbar

The Mesh Toolbar is used to interact with a mesh object or model



Create Vertex: Plots another vertex into the model

Build Face: Creates a face within a series of edges

Mirror: Creates a symmetrical structure based on the selected items

Weld: Organizes a group of selected vertices to a single point

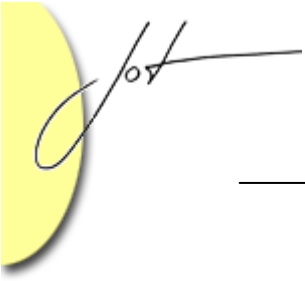
Merge: Do not use. Use Weld instead

Subdivide: Divides a face into a group of smaller faces

Extrude: Creates a perpendicular extension of a face

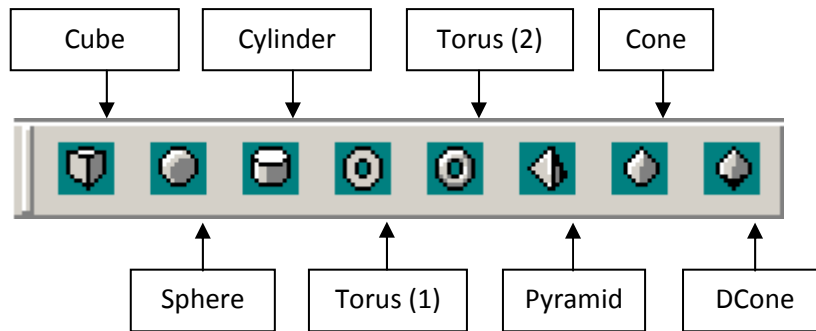
Flip Normals: Flips a face's front and back

Magnet: Used to raise and lower faces of a terrain model. (Must be either created as a terrain or must be converted to a terrain for it to be available)



6. Primitive Toolbar

The Primitive Toolbar is used to create basic 3-dimensional shapes in the environment



Cube: Creates a basic 6-sided cube

Sphere: Creates a sphere

Cylinder: Creates a cylinder

Torus(1): Creates a torus (donut shape)

Torus(2): Creates a more intricate torus

Pyramid: Creates a pyramid

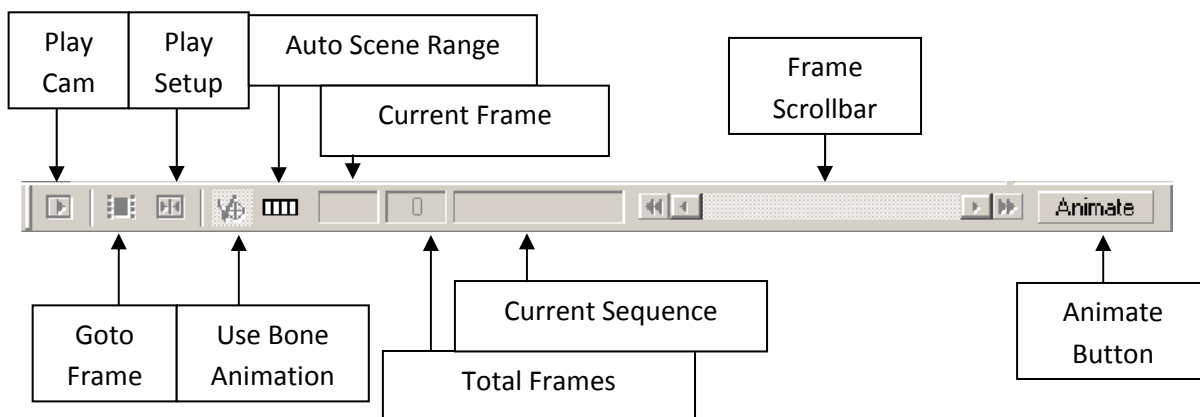
Cone: Creates a cone

DCone: Creates two cones that share the same base so that the point is on both ends



7. Frames Toolbar

The Frames Toolbar is used for dealing with animation frames



Play Cam: Runs through the animation frames

Goto Frame: Sets the animation to a particular frame

Play Setup: Used for specifying a range of animation and a few other properties

Use Bone Animation: Used to toggle on/off bones in the animation playback

Auto Scene Range: Used to toggle between playing one animation sequence or all sequences

Current Frame: Shows the frame number of the current animation sequence

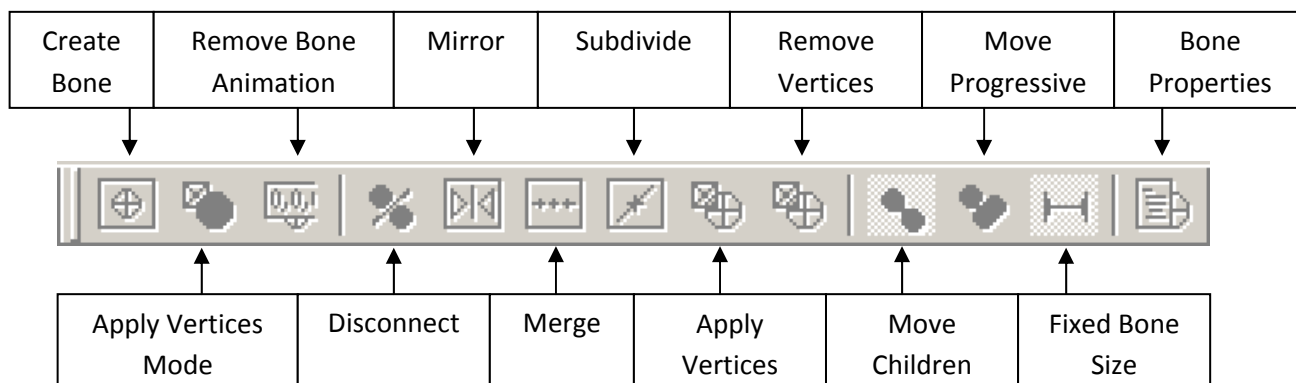
Total Frames: Shows the total number of frames in the current animation sequence

Frame Scrollbar: Allows animation frame selection by clicking and dragging

Animate Button: Toggles on/off of Frames Toolbar buttons

8. Bones Toolbar

The Bones Toolbar is used to create and manipulate bones to be used in animations



Create Bone: Creates a bone

Apply Vertices Mode: Used to allow access to vertices after a bone is created

Remove Bone Animation: Removes the bone animation from a bone or bones for a specific frame

Disconnect: Removes a linkage between two bones

Mirror: Creates another bone structure mirroring the current bone selection

Merge: Used to merge two bones together

Subdivide: Used to create two separate bones from one

Apply Vertices: Used to specify vertices to a particular bone

Remove Vertices: Removes vertices from a particular bone

Move Children: Moves adjacent bones with current selection

Move Progressive: Moves all bones that are connected

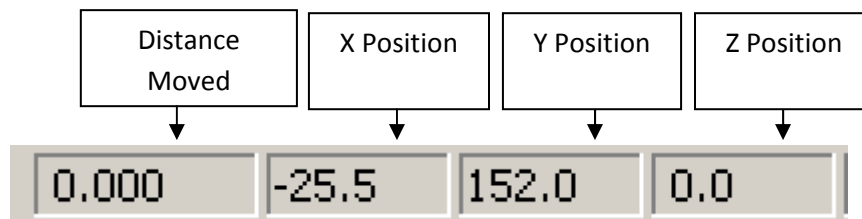
Fixed Bone Size: Toggles whether to use the default bone size or not

Bone Properties: Allows for the alteration of bone specifics



9. X Y Z Location

This small bar merely shows the location of the current mouse pointer within the environment. It is being mentioned due to its usefulness and anyone using MED should be aware of its existence

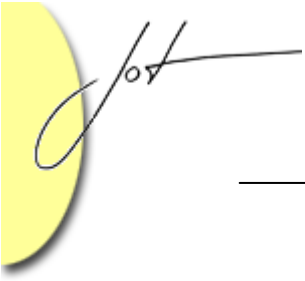


Distance Moved: Shows how far the mouse cursor has moved. Very helpful for knowing the distance that a particular object has been moved or rotated

X Position: Location on the X axis















Y Position: Location on the Y axis

Z Position: Location on the Z axis



10. Views Toolbar

The Views Toolbar is used to basically see other things than what is in the current viewing mode. For example: should one be in “Triangle mode” he or she would not be able to see the vertices of those triangles. By clicking “Show Vertices”, the vertices would then appear

	Show 2D Vertices Ticks: Enlarges all vertices in the 2-Dimensional views
	Show 3D Vertices Ticks: Enlarges all vertices in the 3-Dimensional view
	Show Vertices: Allows visualization of vertices
	Show Faces: Allows visualization of faces
	Show Bones: Allows visualization of bones
	Hide Selected: Makes the current selection invisible
	Hide Unselected: Makes everything invisible except what is selected
	Flip: Flips all faces
	Show All: Makes it so that nothing is invisible
	Fit All: All displays show the entire model
	Fit Selected: All displays show all of the selection
	Top View: Enlarges TOP view and shrinks the others
	Front View: Enlarges FRONT view and shrinks the others
	Side View: Enlarges SIDE view and shrinks the others
	3D View: Enlarges 3D view and shrinks the others
	View Default: Reverts all views to the default sizes



11. Glossary

Animation Sequence: A series of movements that can either be cyclical (walking) or single-run (dying)

Axis: A line used to plot points in an environment. Typically, two axes (plural of axis) or more are used to create a coordinate space where points are plotted

Bones: The interior structure that introduces constraints in movement

Edge: A line that connects two vertices (plural of vertex)

Extrude: To extend the face of a polygon by creating another series of vertices and edges

Face: The side of a polygon that can be seen. (Also known as a facet)

Joint: The meeting position of two bones

Polygon: A geometric shape that is created by connecting vertices with edges

Primitive: A basic 3-Dimensional object such as a sphere, cube, or cone

Mapping: Used to specify which portion of an image is used for a particular polygon

Mesh: The completed exterior of model Polygons

Material: The set of effects applied to a particular texture

Mirror: To create a symmetrical set of vertices and edges

Model: The combined polygons, bones, and animations which can be used in an exterior environment

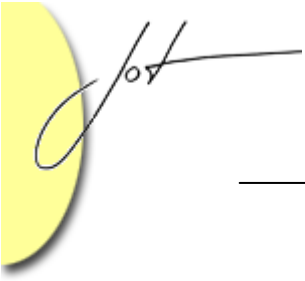
Skeleton: The complete bone structure within a model

Skin: A set of textures and materials to be used for a model

Terrain: A specific type of model that is large and doesn't have animations

Texture: The bitmapped image used to give a polygon a visual representation

Vertex: A point in space where two or more edges meet



About the authors

Rex Cason II has been working with Dr. Prayaga in the UWF Game Department for the past few semesters. He currently possesses a Bachelor's degree in Computer Science and is working towards a Master's degree in Software Engineering at the University of West Florida. Rex is also an active member in the Association of Information Technology Professionals (AITP). In addition to his studies, Rex works part time at the Institute for Human and Machine Cognition (IHMC), where he is currently working on developing software to coordinate the actions of semi-autonomous robotic vehicles.

Erik Larson has been working with computers since he had purchased a cheap 386 IBM Compatible in 1995. In 1999, he entered the United States Marine Corps and pursued a specialization in computers. Today he is working towards a Master's degree in Software Engineering with the University of West Florida. He currently possesses Bachelor's degrees in Information Technology and Computer Information Systems with minors in Computer Science, Internet Technologies and e-Business also from the University of West Florida. He is a member of the Phi Kappa Phi, Gamma Beta Phi, and Upsilon Pi Epsilon Honors Societies.

Jonathan Robertson currently works at the Game Design Department in the University of West Florida. He hopes to one day have a career designing entertainment software with an emphasis on the quality and involvement of the story being told through the game.

Jonathan Frisch is working for a degree in Digital Media and studying animation/modeling itself and in games and movies. He hopes to get into the animation/modeling field of game development or movie production. His ultimate future goal is to be an independent film writer/director.

George Trice III is an Honors student double-majoring in Interdisciplinary Information Technology: Digital Media and Art with a Digital Specialization. His minor is in Communication Arts. He's been a gamer since age 5. Favorite game of all time: Super Mario World

Dr. Lakshmi Prayaga has recently completed her ED.d program from the University of West Florida. She has been actively working on the influence of games in education. In partnership with Escambia County in Florida, she was awarded a \$1.5 million grant from the Florida department of education to develop serious games for 7th and 8th graders for mathematics and its relation to real life careers. These games will be implemented during this fall (2007). She is starting a gaming curriculum at the University of West Florida, and some of her students are working on the tutorials for a first person shooter game that will appear in the next few columns.