User Interaction

Input Handling

Cameras

Picking

Separating application logic

Input Handling

InputManager

- Field of SimpleApplication
- Handles input from
  - Mouse
  - Keyboard
  - Joystick
- Is event driven, listen and take action accordingly

InputManager

- Input triggers
  - Key press or mouse action

```
new KeyTrigger(KeyInput.KEY_P)
```

- Different types of triggers
  - KeyTrigger
  - MouseAxisTrigger
  - MouseButtonTrigger
  - JoyAxisTrigger
  - JoyButtonTrigger

InputManager

- Input Mappings
  - String name (case sensitive)
  - One or more triggers

```
inputManager.addMapping("Pause Game",
        new KeyTrigger(KeyInput.KEY_P));
inputManager.addMapping(MoveUpDown,
       new MouseAxisTrigger(MouseInput.AXIS_Y, true),
       new MouseAxisTrigger(MouseInput.AXIS_Y, false));
```

InputManager

- Add input listeners to handle input

```
inputManager.addListener(actionListener, "Pause Game");
```

- Listener types:
  - ActionListener (on/off)

```
public void onAction(String name, boolean keyPressed, float tpf)
```

  - AnalogListener (continious)

```
public void onAnalog(String name, float value, float tpf)
```

  - TouchListener (touch devices)

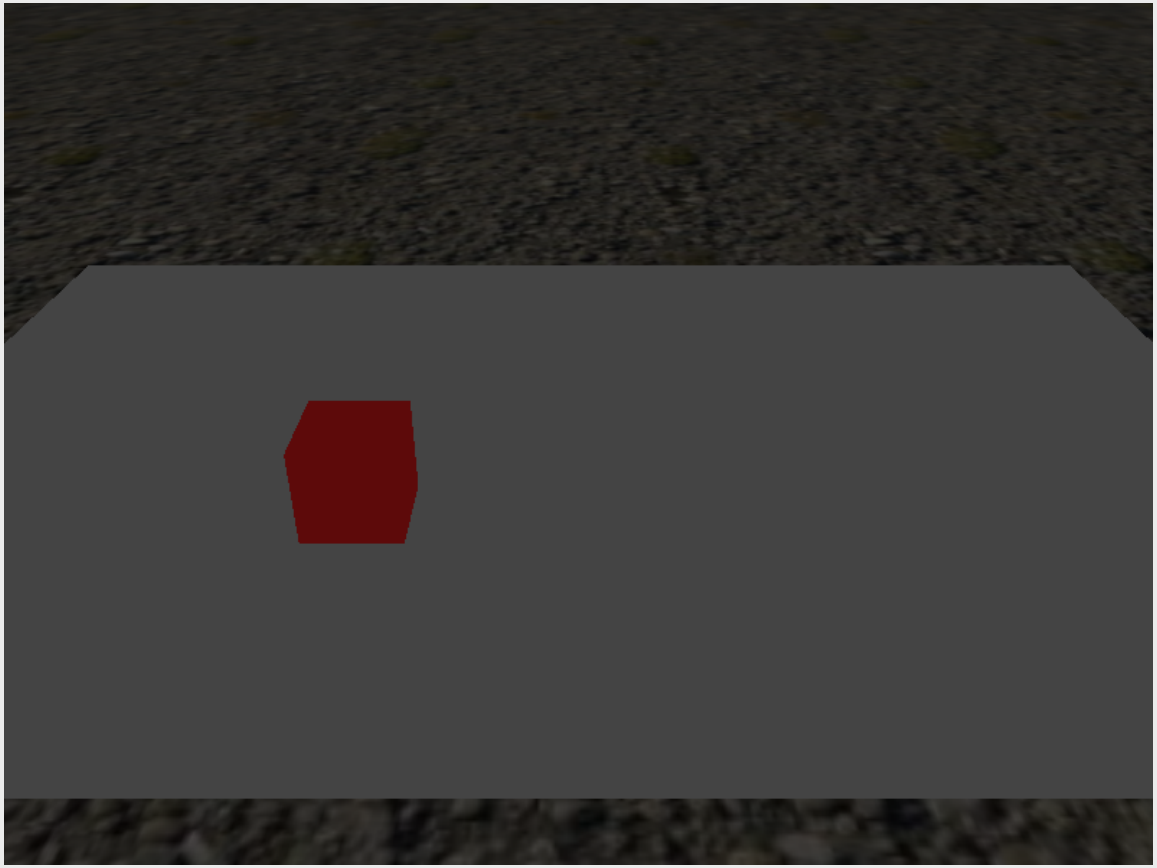
```
Public void onTouch(String name, TouchEvent evt, float tpf)
```

- Callback only gives the named input mapping

Input Example

InputExample.java

Navigation example

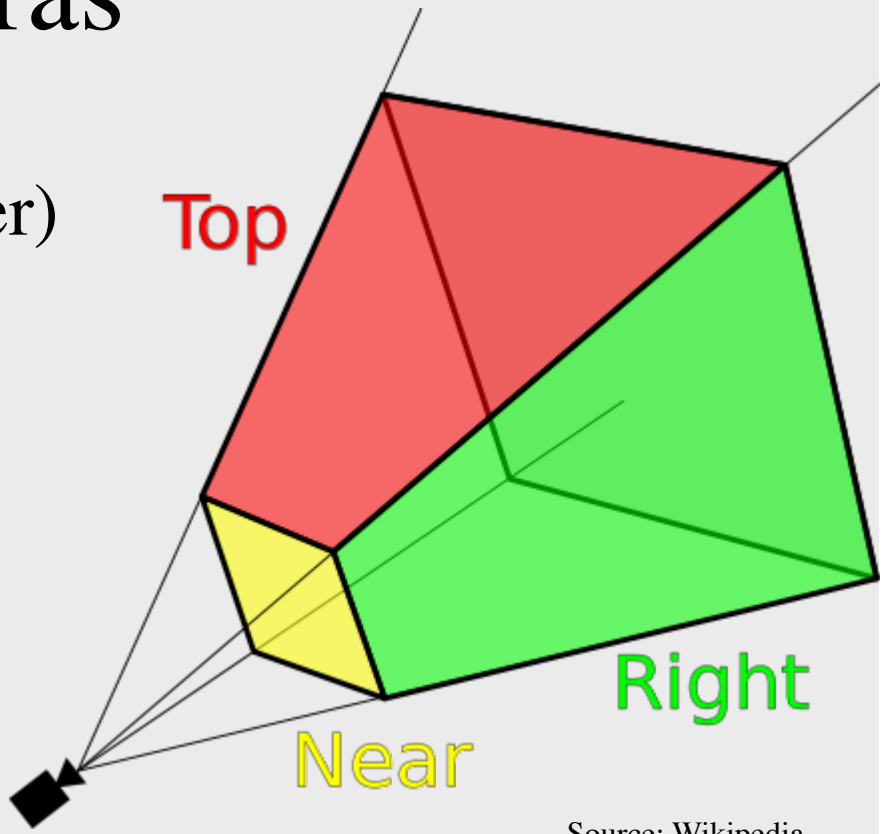


NavigationExample.java

Cameras

Cameras

- Camera (com.jme3.renderer)
  - Purely mathematical
  - View and projection matrix
  - Frustrum
  - Location and rotation
  - Forward, up, and right Direction vectors
  - Used by camera implementations
  - Culling

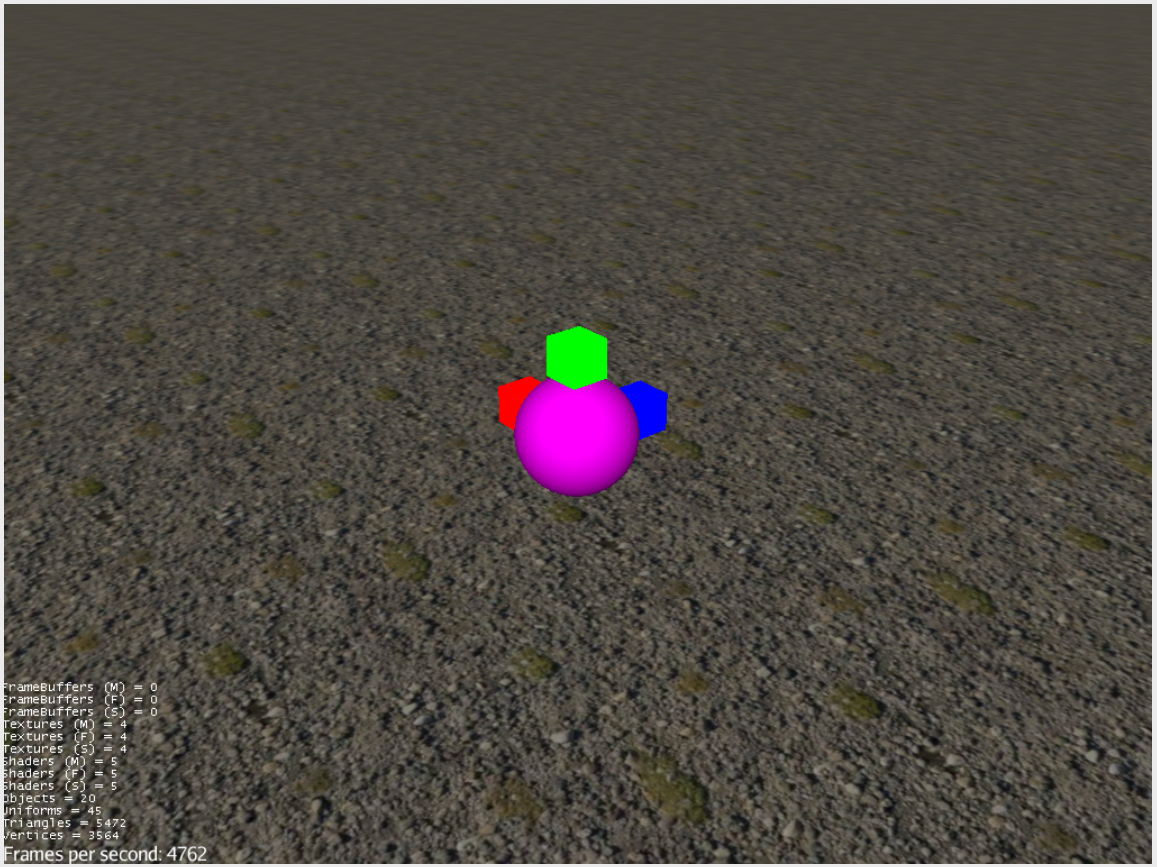


Source: Wikipedia

Cameras

- Various camera implementations:
  - FlyByCamera
    - First person controls
  - ChaseCamera
    - Third person controls, follows with a smooth transition
  - CameraNode
    - Third person, fixed distance
  - (ExamineCamera)

Camera Example



CameraTypesExample.java

Picking

Picking

- Ray Casting
- Intersection with Bounding Volumes
  - Axis Aligned Bounding Box
  - BoundingSphere
  - Oriented Bounding Box
  - Capsule
- If collision with BV, per triangle intersection

Picking

- Construct a ray with a from location and a direction

```
Ray ray = new Ray(Vector3f.ZERO, Vector3f.NEGATIVE_Z);
```

- CollisionResults stores the result from the pick operation

```
CollisionResults results = new CollisionResults();
```

- Check collision with subgraph

```
subgraphToPick.collideWith(ray, results);
```

- Get the collision

```
CollisionResult closest = results.getClosestCollision();
results.getFarthestCollision();

public Iterator<CollisionResult> iterator()
```

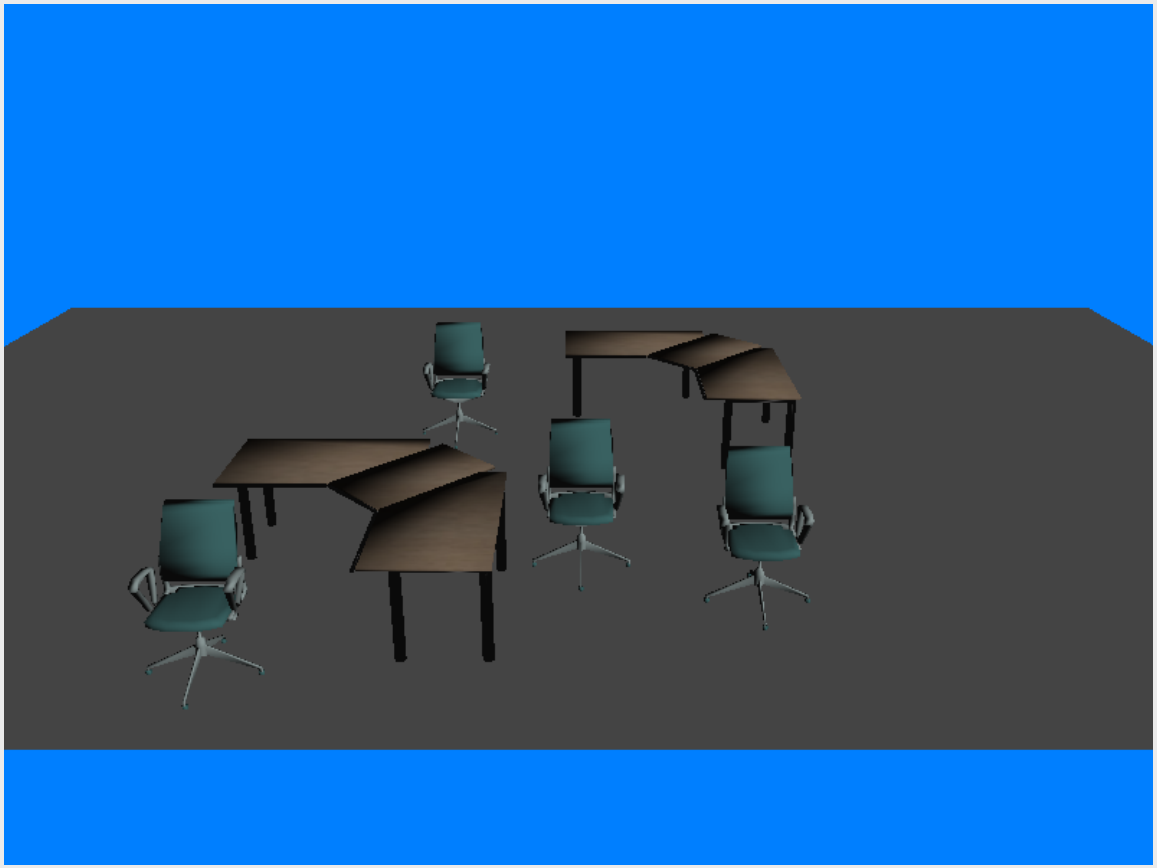
Picking

- The pick result contains detailed information
  - Geometry, mesh and triangle
  - Point, normal and distance
- Results can be sorted
- Note: jME counts intersection with front and back of a mesh as two hits

Picking

- Pickable/Collidable objects must implement Collidable interface
  - Spatial, Node and Geometry
- BV can be used to check collision between shapes
  - Much cheaper than physics collision (simulation)

Picking Example



PickingExample.java

Controls

Controls

- Control contains code/behavior specific to individual Spatials or types of spatials
- Scope of a Control is limited to the Spatial (and its subgraph)
- One Spatial can be influenced by several Controls
- Each Spatial needs its own instance of the Control
- Controls can be saved in the .j3o file together with a Spatial.

Controls

- Each Control has:
  - Constructor, cannot modify the spatial here
  - A setSpatial(Spatial ..) method, where you can do initial modifications to the spatial
  - Its own update() loop that hooks into simpleUpdate()
  - Access to other controls added to the spatial
- Controls move blocks of code out of the simpleUpdate() loop
- Create a control by either extending AbstractControl or implement Control interface

Custom Control Example

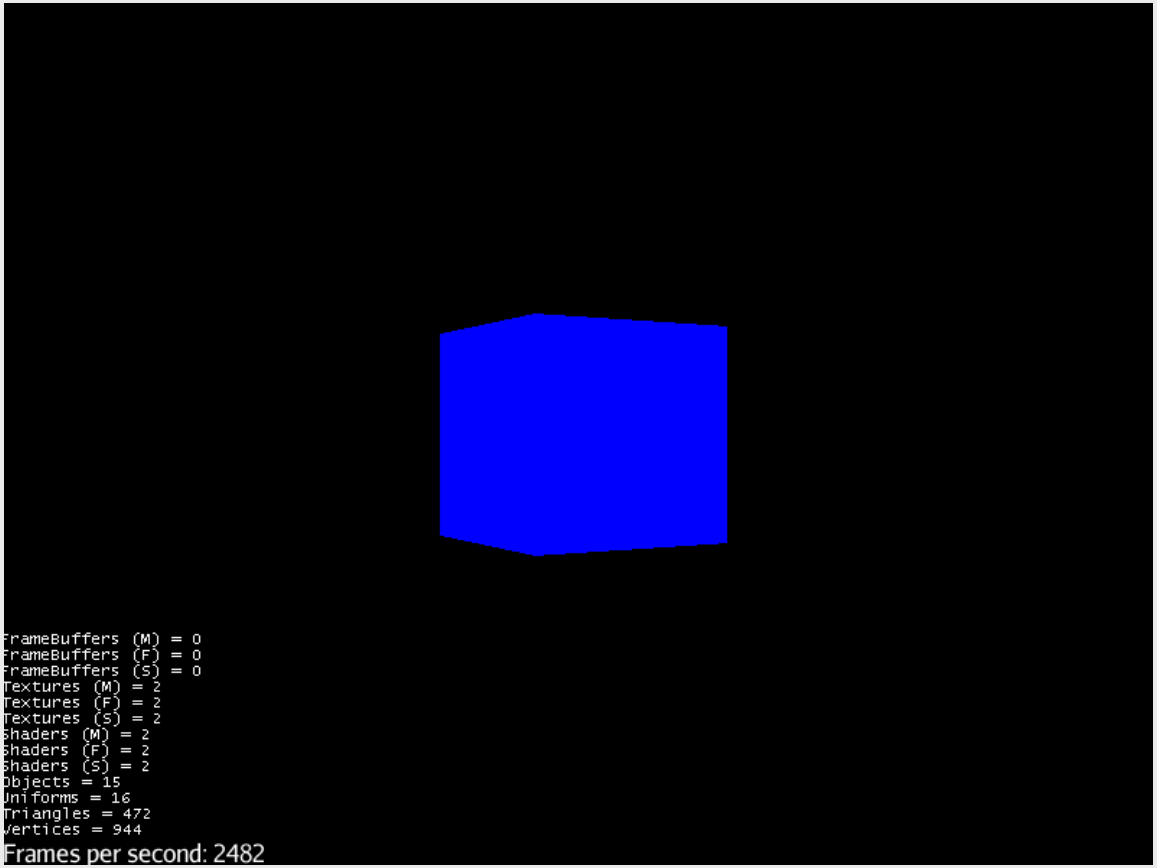
```
Public class MyControl extends AbstractControl{
  public MyControl(Params...){
  }

  public void setSpatial(Spatial spatial){
    super.setSpatial(spatial);
    // control specification initializing code here
  }

  public void controlUpdate(float tpf){
    // update code here
  }

  public Control cloneForSpatial(Spatial spatial){ ... }
  public void controlRender(RenderManager rm, ViewPort vp){ ... }
  public void read(JmeImporter im) throws IOException{ ... }
  public void write(JmeExporter ex) throws IOException{ ... }
}
```

Simple Control Example



RotationWithControl.java

Application States

Application States

- Separation of game logic
- Where Controls enabled logic specific to spatials
- Application States enable logic specific to parts of the application / game
- Application States have access to the whole Application

Application States

- Application State has various methods:
  - initialize(AppStateManager stateManager, Application app)
  - setEnabled(boolean enabled)
  - stateAttached(AppStateManager stateManager)
  - stateDetached(AppStateManager stateManager)
  - update(float tpf)
  - postRender()
  - cleanup()
  - ++

Application State Example

AppStateExample.java