

# LCSIM

## LCSIM Example

This example is taken from the SVN repository: `./Examples/LCSIM/MainLoop.java`.

This loads an existing SLCIO file, and copies it into a ROOT file.

```
// MainLoop.java
// Java wrapper to enable running outside of JAS3
// 16-JUL-2005 Jan Strube
// from a response to the JAS mailing list by Tony Johnson

import java.io.*;
import org.lcsim.util.Driver;
import org.lcsim.util.aida.AIDA;
import org.lcsim.util.loop.LCIODriver;
import org.lcsim.util.loop.LCSimLoop;
import org.lcsim.thirdparty.javaROOT.*;

public class MainLoop
{
    public static void main( String[] args ) throws Exception
    {
        // Load the library
        try
        {
            System.loadLibrary( "javaROOT" );
        }
        catch( UnsatisfiedLinkError javaROOT_linkError )
        {
            System.err.println( "javaROOT native library failed to load.!!!\n" + javaROOT_linkError
+ "\n" );

            System.exit( -1 );
        }

        // Program accepts one argument, an SLCIO file's filename.
        if( args.length != 1 )
        {
            System.err.println( "This program needs to be passed an SLCIO filename." );
            System.exit( -1 );
        }

        RootSessionField sess = new RootSessionField( "org_lcsim.root", "RECREATE", "MainLoop" );
        LCSimLoop loop = new LCSimLoop();

        File input;

        try
        {
            input = new File( args[ 0 ] );
            loop.setLCIORecordSource( input );
            loop.add( new Analysis101( sess ) );
            loop.loop( -1 );
            AIDA.defaultInstance().saveAs( "org_lcsim.aida" );
        }
        catch( IOException e )
        {
            System.err.println( "Could not open SLCIO file: " + e );
        }
        finally
        {
            sess.delete();
        }
    }
}
```

./Examples/LCSIM/Analysis101.java.

```
import org.lcsim.util.aida.AIDA;
import hep.physics.vec.VecOp;
import java.util.List;
import org.lcsim.event.EventHeader;
import org.lcsim.event.MCParticle;
import org.lcsim.util.Driver;
import java.io.Console;
import org.lcsim.thirdparty.javaROOT.*;

/**
 * An example showing how to access MCParticles from the EventHeader and
 * make some simple histograms from the data.
 *
 * @author Norman Graf
 * @version $Id: Analysis101.java,v 1.1 2008/10/30 23:38:19 jeremy Exp $
 */
public class Analysis101 extends Driver
{
    private AIDA aida = AIDA.defaultInstance();
    private RootSessionField sess;

    public Analysis101(RootSessionField session)
    {
        sess = session;
        sess.newTTree("analysis101", "Test", 99);
        sess.branchTTreeFloat("analysis101", "energy");
        sess.branchTTreeFloat("analysis101", "cosTheta");
        sess.branchTTreeFloat("analysis101", "phi");
        sess.setupTTree("analysis101");
        sess.newTH1F( "nTracks", "Number of Tracks", 10, 0, 200 );
    }

    protected void process(EventHeader event)
    {
        // Get the list of MCParticles from the event
        List<MCParticle> particles = event.get(MCParticle.class,event.MC_PARTICLES);
        // Histogram the number of particles per event
        aida.cloud1D("nTracks").fill(particles.size());
        sess.fillTH1F( "nTracks", particles.size() );

        // Loop over the particles
        for( int i = 0; i < particles.size(); i++ )
        {
            sess.fillBranchFloat( "analysis101", "energy", (float)particles.get( i ).getEnergy() );
            sess.fillBranchFloat( "analysis101", "cosTheta", (float)VecOp.cosTheta(particles.get( i
).getMomentum() ) );
            sess.fillBranchFloat( "analysis101", "phi", (float)VecOp.phi(particles.get( i ).
getMomentum() ) );

            sess.fillTTree( "analysis101" );

            aida.cloud1D("energy").fill(particles.get( i ).getEnergy());
            aida.cloud1D("cosTheta").fill(VecOp.cosTheta(particles.get( i ).getMomentum()));
            aida.cloud1D("phi").fill(VecOp.phi(particles.get( i ).getMomentum()));
        }

        System.out.println("Event : "+ event);
    }
}
```