library(coda)

# Data

y=c(28,8,-3,7,-1,1,18,12)

sigma=c(15,10,16,11,9,11,10,18)

sigma2 = sigma^2

J = 8

# Total MCMC Iterations

T = 20000

# Ten unknowns (eight effects, plus their mean and variance)

samps = matrix(, T, 10)

colnames(samps) <- c("mu","tau","Sch1","Sch2","Sch3","Sch4",

"Sch5","Sch6","Sch7","Sch8")

# Starting values

mu=mean(y)

tau2=median(sigma2)

# Sampling loop

for (t in 1:T) {th.mean=(y/sigma2+mu/tau2)/(1/sigma2+1/tau2)

th.sd=sqrt(1/(1/sigma2+1/tau2))

theta=rnorm(J,th.mean,th.sd)

mu=rnorm(1,mean(theta),sqrt(tau2/J))

# precision

invtau2=rgamma(1,J/2+0.1,sum((theta-mu)^2)/2+0.1)

tau2 = 1/invtau2

tau = sqrt(tau2)

# accumulate samples

samps[t,3:10] = theta

samps[t,1] =mu

samps[t,2] =tau}

# posterior summary

summary(as.mcmc(samps))

post.mn = apply(samps,2,mean)

post.sd = apply(samps,2,sd)

post.median = apply(samps,2,median)

post.95=apply(samps, 2, quantile, probs = c(0.95))

post.05=apply(samps, 2, quantile, probs = c(0.05))

# Trace and density plots

plot(as.mcmc(samps))