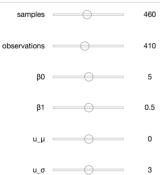
```
In [1]: using Distributions
            using Gadfly
            using Interact
In [2]: set_default_plot_size(25cm, 12cm)
In [4]: @manipulate for samples in 10:50:1000, observations in 10:100:1000, β0 in 0:10, β1 in 0:0.1:1, u μ in -5:5, u σ in 1:5
                  # Create lists for values of \beta_0 and \beta_1
                 β0_hat = []
β1_hat = []
                 \# Collect values of \beta among different samples for sample in 1:1:samples
                       ## Initial
                       x_values = rand(Uniform(0,100),observations)
                       u = rand(Normal(u_\mu, u_\sigma), observations)

y_values = \beta 0 + \beta 1 * x_values + u
                       ## Classical Linear Regression
                       X = [ones(x_values) x_values]

\beta = inv(X'*X)*X'*y_values
                       ## Save values push!(\beta0_hat, \beta[1]) push!(\beta1_hat, \beta[2])
                  # Plot
                 ## Example values
x_values = rand(Uniform(0,100),observations)
                 u = rand(Normal(u_\mu, u_\sigma), observations)

y_{values} = \beta 0 + \beta 1 * x_{values} + u
                    = [ones(x_values) x_values]
                 \beta = inv(X'*X)*X'*y_values
                 # CLR graph
graph CLR = plot(
                       la_LLR = plot(
layer(x=x_values, y=y_values, Geom.point, order=1),
layer(x=x_values, y=X*β, Geom.line, order=2, Theme(default_color=colorant"black", line_width=1pt)),
Guide.XLabel("Values of x"),
Guide.YLabel("Values of y"),
Guide.Title("Classical Linear Regression"),
                       Coord.Cartesian(xmin=0,xmax=100,ymin=0,ymax=100, fixed=true)
                  # Distribtuion of \beta_1
                  graph_{\beta} = plot(
                        layer(x=\beta 1_hat, Geom.histogram(bincount=50), order=1),
                       layer(xintercept=[β1], Geom.vline(color=["black"], style=[[1mm]], size=[.5mm]), order=3),
                       Guide. YLabel ("Estimates of \beta_1"), Guide. YLabel ("Number of Observations"),
                       Guide.Title("Distribution of β_1")
                  hstack(graph\_CLR, graph\_\beta)
            end
                 samples
```



Out[4]:

