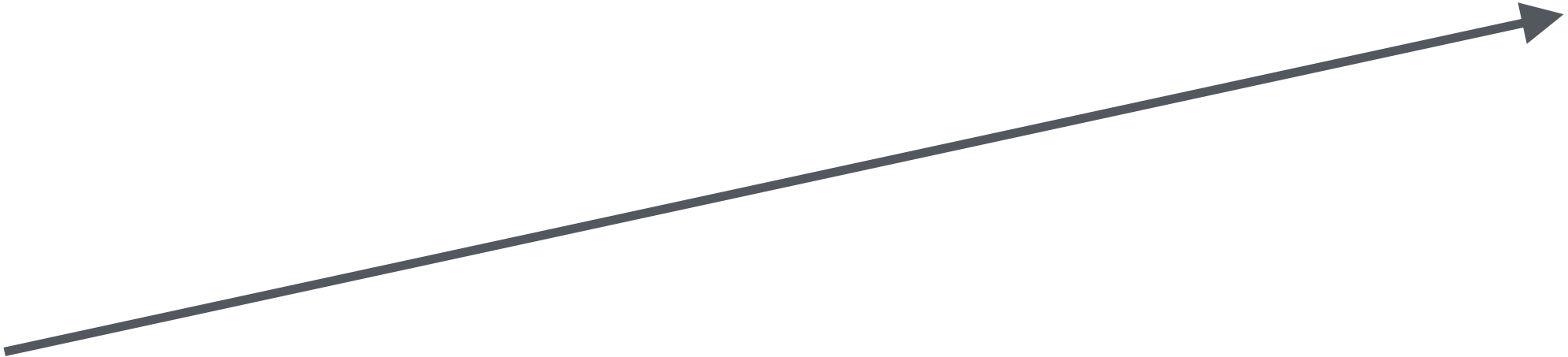
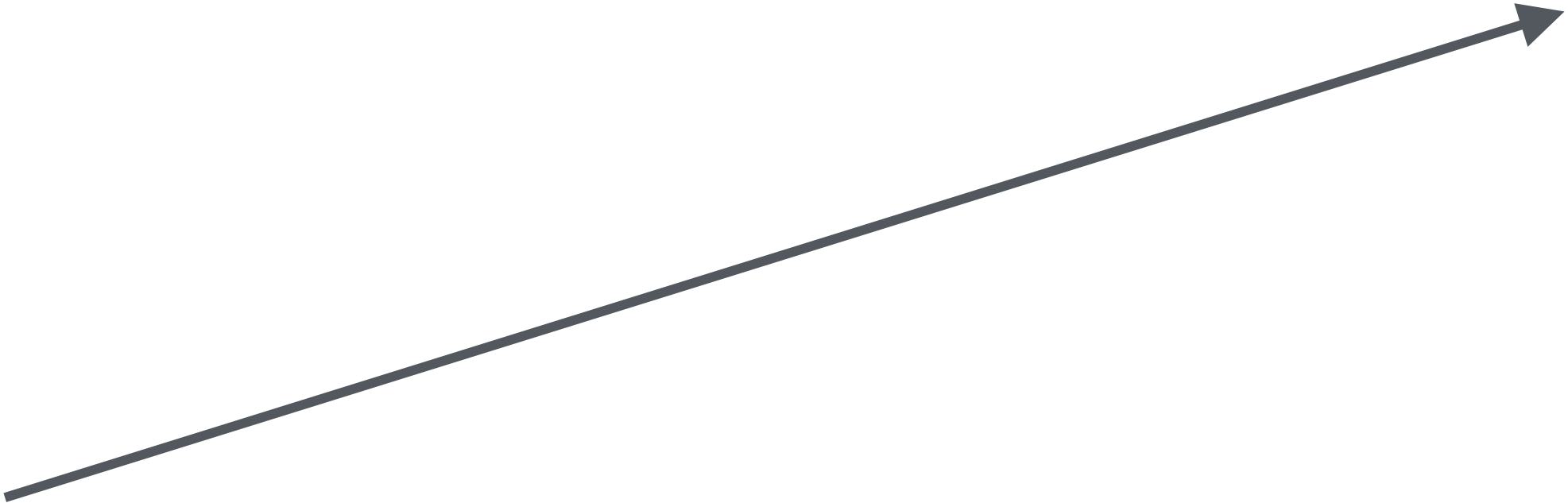
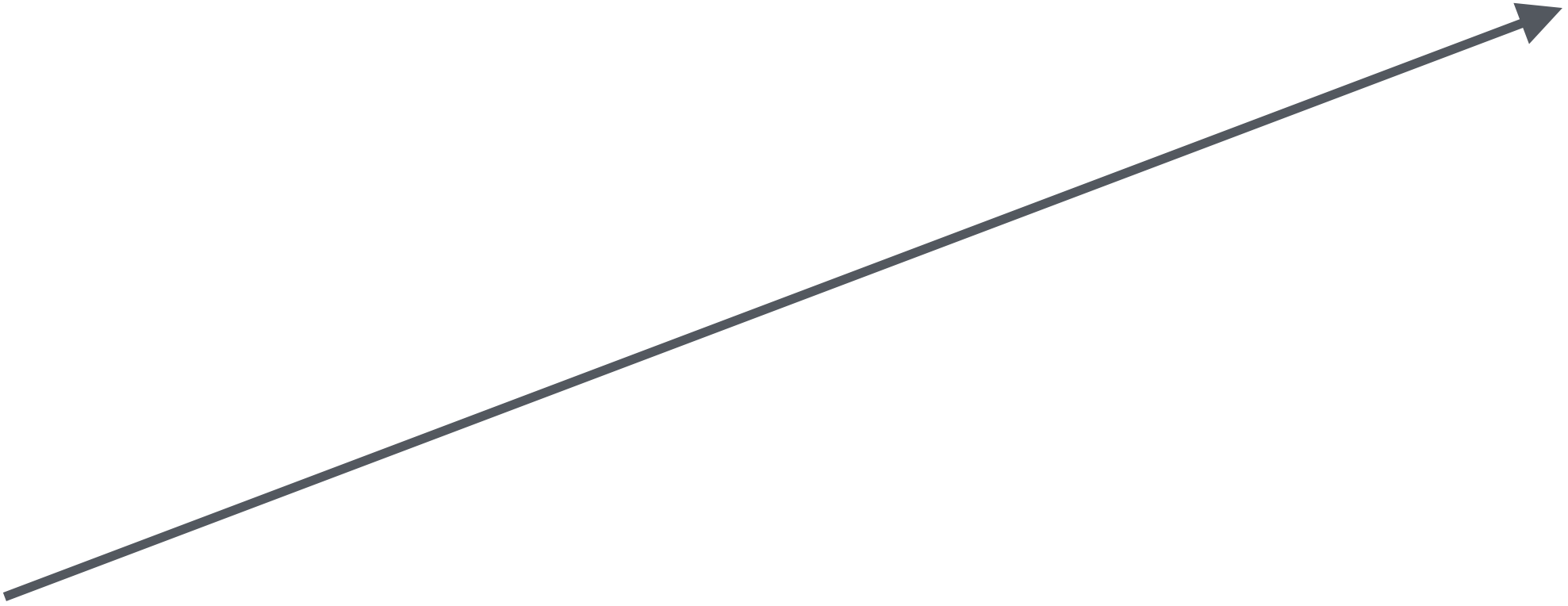
All the ingredients for a computational fit

Our standard model

```r
# Data
library(rethinking)
d2 <- Howell1[ Howell1$age >= 18 , ]

# Model
ulam(alist(
  y ~ normal(mu, sigma),
  mu <- a + b * x,
  a ~ normal(0, 20),
  b ~ lognormal(0, 1),
  sigma ~ exponential(1)),
  data = list(y = d2$height,
              x = d2$weight),
  iter = 1000, chains = 4, cores = 4)
```







$$y_i \sim Normal(\mu_i, \sigma)$$

$$\mu_i = \alpha + \beta x_i$$

$$\alpha \sim Normal(0, 20)$$

$$\beta \sim lognormal(0, 1)$$

$$\sigma \sim Exponential(1)$$

Our standard model

All the ingredients for a computational fit

$$y_i \sim Normal(\mu_i, \sigma)$$
$$\mu_i = \alpha + \beta x_i$$
$$\alpha \sim Normal(0, 20)$$
$$\beta \sim lognormal(0, 1)$$
$$\sigma \sim Exponential(1)$$

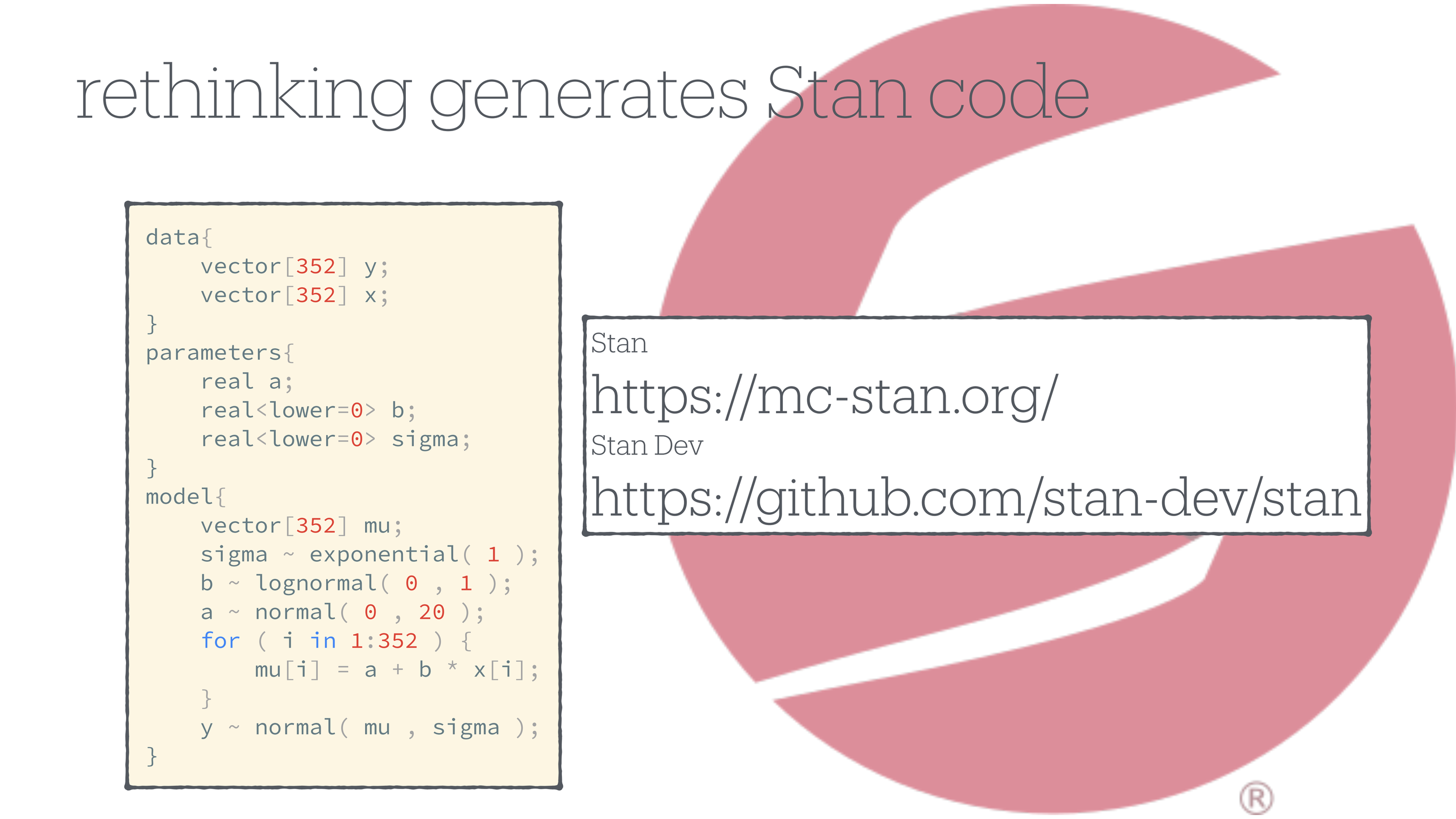
```
# Data
library(rethinking)
d2 <- Howell1[ Howell1$age >= 18 , ]

# Model
ulam(alist(
  y ~ normal(mu, sigma),
  mu <- a + b * x,
  a ~ normal(0, 20),
  b ~ lognormal(0, 1),
  sigma ~ exponential(1)),
  data = list(y = d2$height,
              x = d2$weight),
  iter = 1000, chains = 4, cores = 4)
```

rethinking generates Stan code

```
data{
    vector[352] y;
    vector[352] x;
}
parameters{
    real a;
    real<lower=0> b;
    real<lower=0> sigma;
}
model{
    vector[352] mu;
    sigma ~ exponential( 1 );
    b ~ lognormal( 0 , 1 );
    a ~ normal( 0 , 20 );
    for ( i in 1:352 ) {
        mu[i] = a + b * x[i];
    }
    y ~ normal( mu , sigma );
}
```

Stan

https://mc-stan.org/

Stan Dev

https://github.com/stan-dev/stan