```
parameters {
    real xs[T];
}
model {
    xs[1] ~ normal(0.0, 1.0);
    for (t in 2:T)
        xs[t] ~ normal(a * xs[t - 1], q);
    for (t in 1:T)
        ys[t] ~ normal(xs[t], 1.0);
}
```