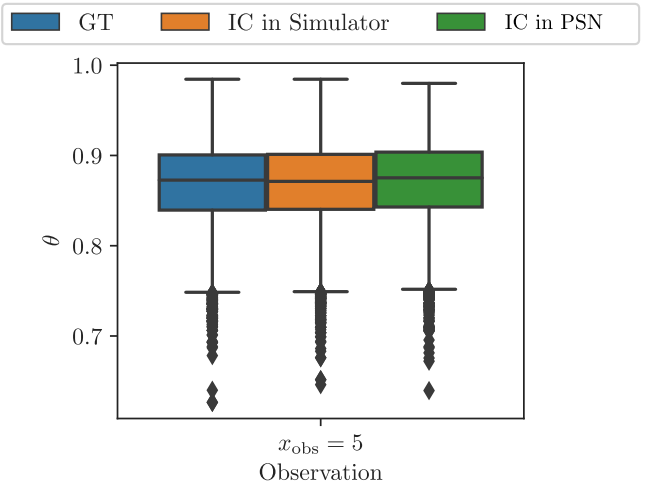
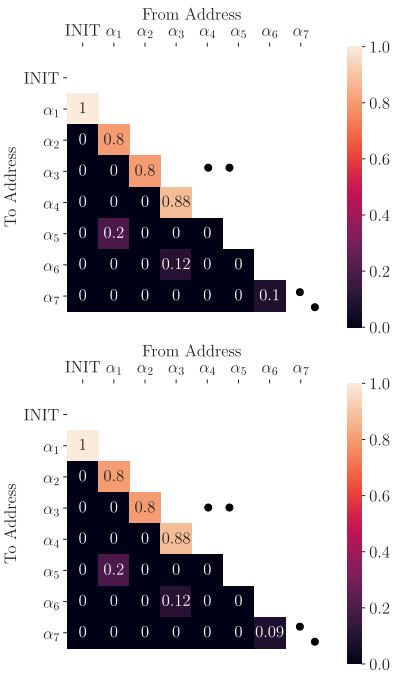
a)

```
def control_flow_program(x):
    d1 = Beta(50, 7)
    θ = sample(dist=d1)
    μ = 0
    while True:
        d2 = Categorical(prob=[1/5, 4/5])
        b = sample(dist=d2)
        if b:
            d3 = Normal(mean=0, std=1/2)
            z = sample(dist=d3)
        else:
            d3 = Normal(mean=2, std=1/2)
            z = sample(dist=d3)
        μ += z
        d4 = Categorical(prob=[1-θ,θ])
        c = sample(dist=d4)
        if c:
            break
    d5 = Normal(mean=μ, std=1)
    observe(x, likelihood=d5)
    return θ
```

b)



c)