

Monty Hall Constraints

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Parse results after processing KLEE dump for Monty Hall Example.

```
Path : 1
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!((!(car_door_sym == 2) && !(choice_pse_var_sym == 2)))
!(!(door_switch_pse_var_sym == 0))

Path : 2
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
(! (car_door_sym == 2) && !(choice_pse_var_sym == 2))
!(door_switch_pse_var_sym == 0)
!(choice_pse_var_sym == 1)

Path : 3
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!((!(car_door_sym == 2) && !(choice_pse_var_sym == 2)))
!(door_switch_pse_var_sym == 0)
```

```
choice_pse_var_sym == 1
```

Path : 4

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!((!(car_door_sym == 2) && !(choice_pse_var_sym == 2)))
!(door_switch_pse_var_sym == 0)
!(choice_pse_var_sym == 1)
```

Path : 5

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
(!(car_door_sym == 1) && !(choice_pse_var_sym == 1))
!(!(door_switch_pse_var_sym == 0))
choice_pse_var_sym == car_door_sym
```

Path : 6

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
(!(car_door_sym == 1) && !(choice_pse_var_sym == 1))
!(!(door_switch_pse_var_sym == 0))
!(choice_pse_var_sym == car_door_sym)
```

Path : 7

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!((car_door_sym == 2) && !(choice_pse_var_sym == 2))
!(!(door_switch_pse_var_sym == 0))
```

```
choice_pse_var_sym == car_door_sym
```

Path : 8

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!((!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!(car_door_sym == 2) && !(choice_pse_var_sym == 2)
!((door_switch_pse_var_sym == 0))
!(choice_pse_var_sym == car_door_sym)
```

Path : 9

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!(car_door_sym == 1) && !(choice_pse_var_sym == 1)
!(door_switch_pse_var_sym == 0)
!(choice_pse_var_sym == 2)
car_door_sym == 2
```

Path : 10

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!(car_door_sym == 1) && !(choice_pse_var_sym == 1)
!(door_switch_pse_var_sym == 0)
!(choice_pse_var_sym == 2)
!(car_door_sym == 2)
```

Path : 11

```
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!(car_door_sym == 1) && !(choice_pse_var_sym == 1)
```

```

!(door_switch_pse_var_sym == 0)
choice_pse_var_sym == 2
car_door_sym == 3

```

```

Path : 12
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
(!(car_door_sym == 1) && !(choice_pse_var_sym == 1))
!(door_switch_pse_var_sym == 0)
choice_pse_var_sym == 2
!(car_door_sym == 3)

```

```

Path : 13
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!(!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!(!(car_door_sym == 2) && !(choice_pse_var_sym == 2))
!(door_switch_pse_var_sym == 0)
choice_pse_var_sym == 1
car_door_sym == 3

```

```

Path : 14
0 <= door_switch_pse_var_sym
door_switch_pse_var_sym <= 1
0 <= choice_pse_var_sym
choice_pse_var_sym <= 3
0 <= car_door_sym
car_door_sym <= 3
!(!(car_door_sym == 1) && !(choice_pse_var_sym == 1)))
!(!(car_door_sym == 2) && !(choice_pse_var_sym == 2))
!(door_switch_pse_var_sym == 0)
choice_pse_var_sym == 1
!(car_door_sym == 3)

```

We present the observations for the Monty Hall.

- For `door_switch == 0`
`(P(win) >= 0.5) passes,`
- For `door_switch == 1`
`(P(win) >= 0.5) fails,`
- When `count(door_switch == 0) == count(door_switch == 1)`
`(P(win) <= 0.5) fails`
`(P(win) >= 0.5) passes.`
- When ever `count(door_switch == 0) < count(door_switch == 1)` with bias
Higher probability of winning when the person switches.
`(P(win) <= 0.5) fails :`
 - `Fail : P(choice == car_door) : 0.860216`
 - `Fail : P(choice == car_door) : 0.520136`
 - `Fail : P(choice == car_door) : 0.780963`
 - `...`
- When ever `count(door_switch == 0) > count(door_switch == 1)` with bias
`(P(win) >= 0.5) fails :`
 - `Fail : P(choice == car_door) : 0.499620`
 - `Fail : P(choice == car_door) : 0.379960`
 - `Fail : P(choice == car_door) : 0.139769`
 - `...`