IS609-MathModeling-HW8-JHamski

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1

```
(2/5)*55000 + (3/5)*(-1750)
```

```
## [1] 20950
```

The expected value of the venture is $20,950. Definitely do it!

2

Expected Value - selling cola

```
(3/10)*1500 + (7/10)*5000
```

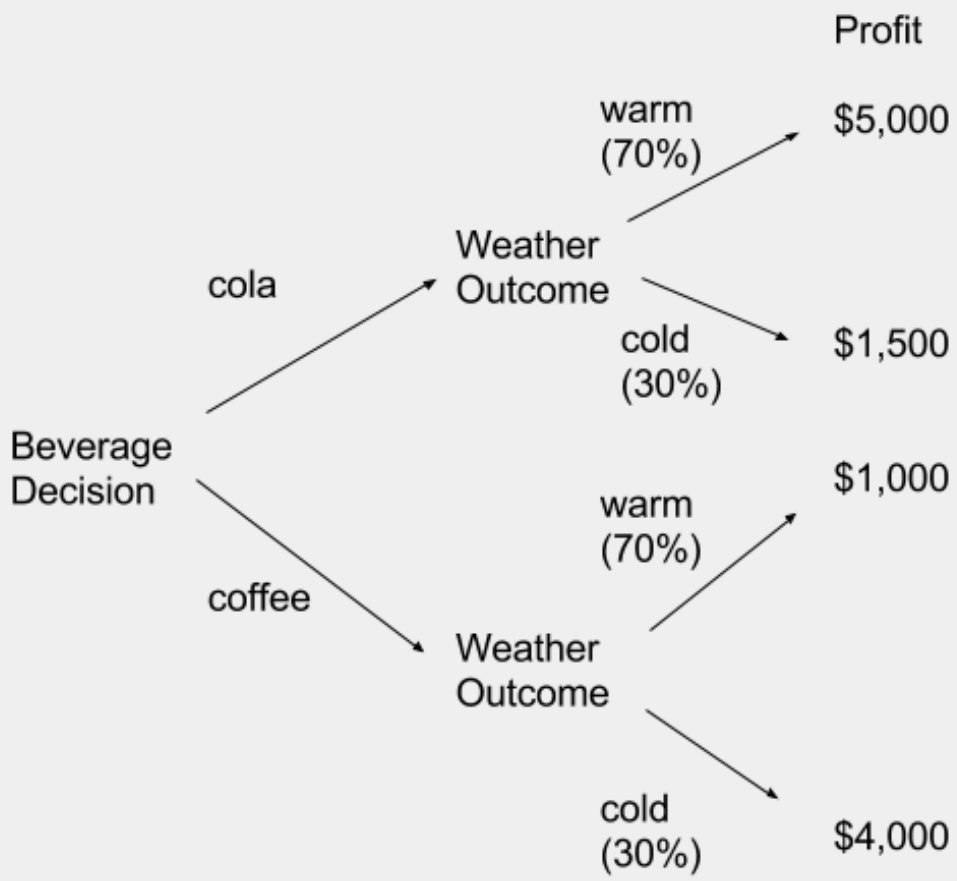
```
## [1] 3950
```

Expected Value - selling coffee

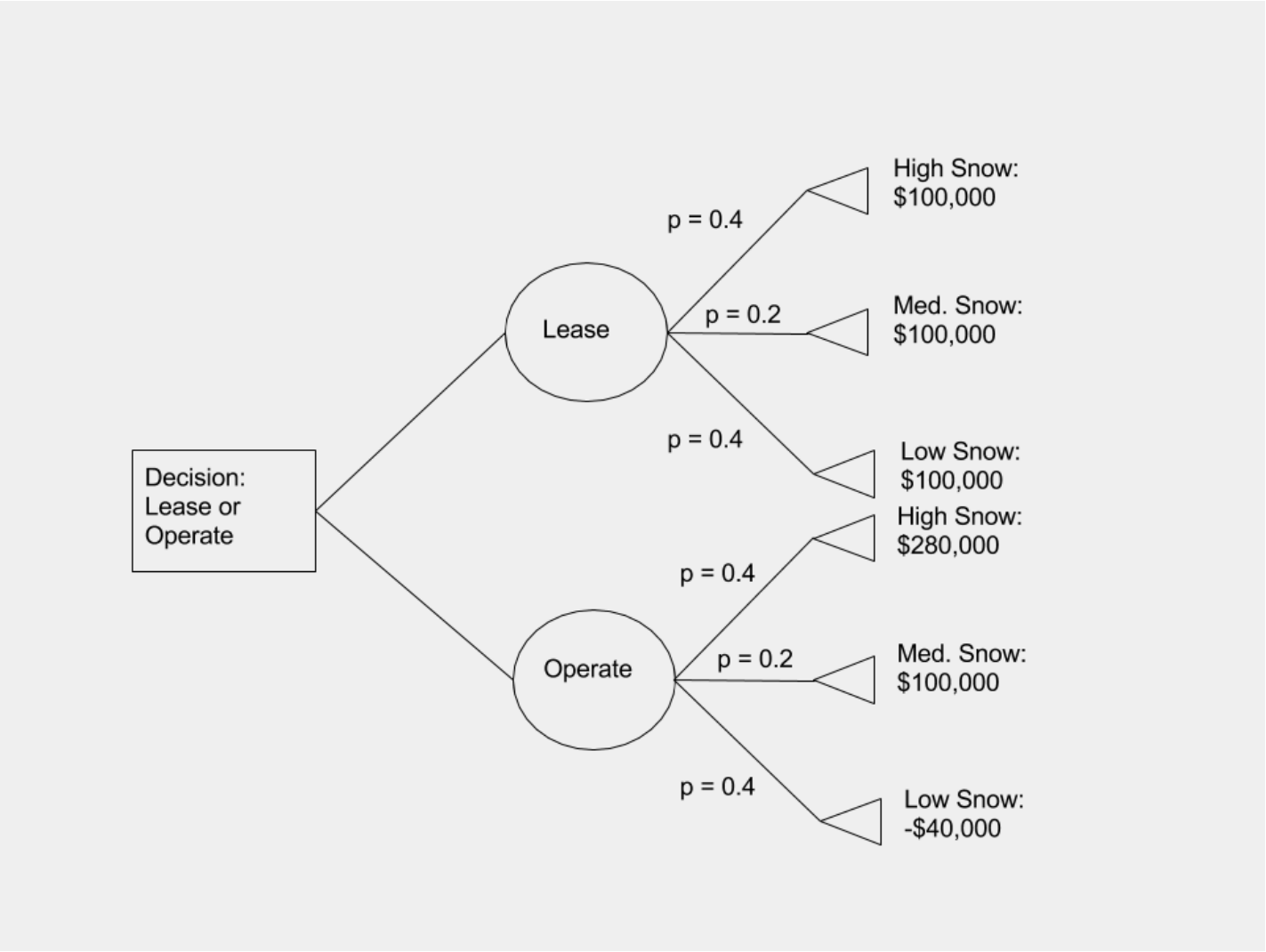
```
(3/10)*4000 + (7/10)*1000
```

```
## [1] 1900
```

The expected value of selling cola is much higher ($3,950) than coffee ($1,900). The main driver here is the relatively low probability of the cold front.


Profit
warm
(70%)
$5,000
Weather
Outcome
cola
cold
(30%)
$1,500
Beverage
Decision
$1,000
warm
(70%)
coffee
Weather
Outcome
cold
(30%)
$4,000

3




```
EV.lease = 1000
```

```
EV.operate = 0.4*240000 + 0.2*100000 + 0.4*(-40000)
EV.operate
```

```
## [1] 1e+05
```

Lease and operate both have the same expected value. Therefore, other criteria must be used to make the decision.

4

Expected value with no geologist assessment:

```
0.45 * (6000000 - 1000000) + 0.55 * (-1000000)
```

```
## [1] 1700000
```

Expected value with a geologist assessment:

```
assessment.positive <- 0.85 * 5000000 + 0.15 * (-1000000)

assessment.negative <- 0.22 * 5000000 + 0.78 * (-1000000)

0.6 * assessment.positive + 0.4 * assessment.negative
```

```
## [1] 2588000
```

The company should hire the geologist to do the assessment.

5

Maximize expected value:

```
(A <- 0.35 * 1100 + 0.3 * 900 + 0.25 * 400 + 0.1 * 300)
```

```
## [1] 785
```

```
(B <- 0.35 * 850 + 0.3 * 1500 + 0.25 * 1000 + 0.1 * 500)
```

```
## [1] 1047.5
```

```
(C <- 0.35 * 700 + 0.3 * 1200 + 0.25 * 500 + 0.1 * 900)
```

```
## [1] 820
```

Choose B.

Regret matrix:

```
r.1 <- c(0, 1100 - 580, 1100 - 700)
r.2 <- c(1500 - 900, 0, 1500 - 1200)
r.3 <- c(1000 - 400, 0, 1000 - 500)
r.4 <- c(900 - 300, 900 - 500, 0)

regret.matrix <- cbind(r.1, r.2, r.3, r.4)

row.names(regret.matrix) <- c("A", "B", "C")

regret.matrix
```

```
##   r.1 r.2 r.3 r.4
## A   0 600 600 600
## B 520   0   0 400
## C 400 300 500   0
```

Choose B.