The code used to complete this problem set is attached in the appendix below.

1. The expected value function can be written as:

$$\mathbb{E}_\epsilon\left[V(i,c,p,\epsilon)\right] = \mathbb{E}_\epsilon\left[\max_{a\in\{0,1\}} U(a|i,c,p,\epsilon) + \beta\sum_{c',p'}\mathbb{E}_{\epsilon'}\left[V(i',c',p',\epsilon')\right]\Pr(c',p'|c,p,a)\right]$$

$$\mathbb{E}_\epsilon\left[V(s,\epsilon)\right] = \mathbb{E}_\epsilon\left[\max_{a\in\{0,1\}} U(a|s,\epsilon) + \beta\sum_{s'}\mathbb{E}_{\epsilon'}\left[V(s',\epsilon')\right]\Pr(s'|s,a)\right]$$

$$\overline{V}(s) = \mathbb{E}_\epsilon\left[\max_{a\in\{0,1\}} U(a|s,\epsilon) + \beta\sum_{s'}\overline{V}(s')\Pr(s'|s,a)\right]$$

Appendix

The first codefile named “runfile.jl" runs the code.

The second codefile named “functions.jl" contains the relevant functions.