Group Members:

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a)the final policy and its deterministic performance level

```
 Usable Ace:
S S S S S S S H S 20
S H S S S S S S H 19
S H S S H S S S S H 18
H H H H H H H H H 17
H H H H H H H H H 16
S H H S H H H H H 15
H H H H H H H H H 14
H H H H H H H H H 13
S H H H H H H H H 12
1 2 3 4 5 6 7 8 9 10

 No Usable Ace:
S S S S S S S S S 20
S S S S S S S S S 19
S S S S S S S S S 18
S S S S S S S S S 17
H S S S S S H H H H 16
H H H S H H H H H 15
H H H H H H H H H 14
H H H H H H H H H 13
H H H H H H H H H 12
1 2 3 4 5 6 7 8 9 10
Average return: -0.0323062
```

b)
the best setting (values of α, ε μ , ε π , and the number of episodes)find in part 3,
along with the policy (by printPolicy) and its performance level.

```
 Usable Ace:
S S S S S S H S S S 20
S S S S S H S S S S 19
S H H S H H S S S S 18
S H H H H H H H H H 17
H S H H H H H H H H 16
H H H H H H H H H H 15
H H H H H H H H H H 14
S H H H H H H H H H 13
H H H H H H H H H H 12
1 2 3 4 5 6 7 8 9 10

 No Usable Ace:
S S S S S S S S S S 20
S S S S S S S S S S 19
S S S S S S S S S S 18
S S S S S S S S S S 17
H S S S S S H H H H 16
H S H S S H H H H H 15
H H H H H H H H H H 14
H H H H H H H H H H 13
H H H H H H H H H H 12
1 2 3 4 5 6 7 8 9 10
Average return: -0.0308869
alpha, emu, epi, episodes: 0.001 0.1 0.01 1000000
```

Below are the combinations I have tried and its output:

episodes:1,000,000
alpha,emu,epi=0.001,0.01,0.01
*alpha,emu,epi=0.001,0.1,0.01
alpha,emu,epi=0.001,0.3,0.01
alpha,emu,epi=0.001,0.5,0.01
*alpha,emu,epi=0.01,0.01,0.01
alpha,emu,epi=0.01,0.1,0.01
alpha,emu,epi=0.01,0.3,0.01
alpha,emu,epi=0.01,0.5,0.01
alpha,emu,epi=0.1,0.01,0.01
alpha,emu,epi=0.1,0.1,0.01
alpha,emu,epi=0.1,0.3,0.01
alpha,emu,epi=0.1,0.5,0.01
alpha,emu,epi=0.5,0.01,0.01
alpha,emu,epi=0.5,0.1,0.01
alpha,emu,epi=0.5,0.3,0.01
alpha,emu,epi=0.5,0.5,0.01
alpha,emu,epi=1,0.01,0.01
alpha,emu,epi=1,0.1,0.01
alpha,emu,epi=1,0.3,0.01
alpha,emu,epi=1,0.5,0.01

foucus on emu:
alpha,emu,epi=0.001,0.05,0.01
*alpha,emu,epi=0.001,0.1,0.01
alpha,emu,epi=0.001,0.2,0.01
alpha,emu,epi=0.001,0.3,0.01
alpha,emu,epi=0.001,0.4,0.01
alpha,emu,epi=0.001,0.6,0.01

Average returnSum, alpha, emu, epi, episodes:
```
 [[ -3.25103000e-02   1.00000000e-03   1.00000000e-02   1.00000000e-02     1.00000000e+07]
  [ -2.88207000e-02   1.00000000e-03   1.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -3.20791000e-02   1.00000000e-03   3.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -3.56829000e-02   1.00000000e-03   5.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -2.84043000e-02   1.00000000e-02   1.00000000e-02   1.00000000e-02     1.00000000e+07]
  [ -3.12683000e-02   1.00000000e-02   1.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -3.18784000e-02   1.00000000e-02   3.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -3.54810000e-02   1.00000000e-02   5.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -4.18718000e-02   1.00000000e-01   1.00000000e-02   1.00000000e-02     1.00000000e+07]
  [ -3.89371000e-02   1.00000000e-01   1.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -4.45740000e-02   1.00000000e-01   3.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -4.83033000e-02   1.00000000e-01   5.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -4.36711000e-02   5.00000000e-01   1.00000000e-02   1.00000000e-02     1.00000000e+07]
  [ -6.21693000e-02   5.00000000e-01   1.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -6.69270000e-02   5.00000000e-01   3.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -7.22758000e-02   5.00000000e-01   5.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -6.40771300e-01   1.00000000e+00   1.00000000e-02   1.00000000e-02     1.00000000e+07]
  [ -5.14418600e-01   1.00000000e+00   1.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -4.45964500e-01   1.00000000e+00   3.00000000e-01   1.00000000e-02     1.00000000e+07]
  [ -2.67080500e-01   1.00000000e+00   5.00000000e-01   1.00000000e-02     1.00000000e+07]]
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[[ -3.09973000e-02   1.00000000e-03   5.00000000e-02   1.00000000e-02    1.00000000e+07]
 [ -2.99924000e-02   1.00000000e-03   1.00000000e-01   1.00000000e-02    1.00000000e+07]
 [ -3.06300000e-02   1.00000000e-03   2.00000000e-01   1.00000000e-02    1.00000000e+07]
 [ -3.24838000e-02   1.00000000e-03   3.00000000e-01   1.00000000e-02    1.00000000e+07]
 [ -3.53480000e-02   1.00000000e-03   4.00000000e-01   1.00000000e-02    1.00000000e+07]
 [ -3.99748000e-02   1.00000000e-03   6.00000000e-01   1.00000000e-02    1.00000000e+07]
```