CPT_S 540 HW4

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1. (a) s1: ¬LikesRA ^ ¬LikesRC,
s2: ¬LikesDA ^ ¬LikesDT,
s3: ¬LikesBC ^ ¬LikesDC,

(b) s4: ¬LikesBC ^ ¬LikesDC ^ ¬LikesRC ⇒ LikesJC

s5: LikesBC v LikesDC v LikesRC v LikesJC (elimination ⇒ from s4)

(c) s6: ¬LikesRC (using and elimination from s1)
s7: LikesBC v LikesDC v LikesJC (from {s6, s5} ⊨ LikesBC v LikesDC v LikesJC)
s8: LikesJC (from {s7, s3} ⊨ LikesJC)

(d)
s9: LikesBA v LikesDA v LikesRA v LikesJA (from KB)
s10: ¬LikesJA (from s8 ⇒ ¬LikesJA)
s11: ¬LikesDA ^ ¬LikesRA (and elimination from s1 ^ s2)
s12: LikesBA (from {s9, s10 ^ s11} ⊨ LikeRA)

(e) s13: LikesRT v LikesDT v LikesBT v LikesJT (from KB)
s14: ¬LikesJT (from s8 ⇒ ¬LikesJT)
s15: ¬LikesBT (from s12 ⇒ ¬LikesBT)
s16: ¬LikesDT (from s2 by and elimination)
s17: LikesRT (from {s13, s14 ^ s15^s16} ⊨ LikeRT)

2. (a) s1: ¬Likes(Raj, Armageddon) ^ ¬Likes(Raj, Checkers),
s2: ¬Likes(Dmitri, Armageddon) ^ ¬Likes(Dmitri, Tetris),
s3: ¬Likes(Bubba, Checkers) ^ ¬Likes(Dmitri, Checkers),

(b) s4: ∀x ¬Likes(Raj, x) ^ ¬Likes(Dmitri, x) ^ ¬Likes(Budda, x) ^ Likes(Jin, x)

(c) ¬Likes(Raj, x) ^ ¬Likes(Dmitri, x) ^ ¬Likes(Budda, x) ^ Likes(Jin, x) ^ (x=Checkers)
s5: ¬Likes(Raj, Checkers) ^ ¬Likes(Dmitri, Checkers) ^ ¬Likes(Budda, Checkers) ^ Likes(Jin, Checkers)
s6: Likes(Jin, Checkers) ^ ¬Likes(Raj, Armageddon), (from {s5, s1 ^ s3}⊨ Likes(Jin, Checkers) ^ ¬Likes(Raj, Armageddon))

s7: Likes(Jin, Checkers) (from any elimination from s6)

(d)

s8: ∀x ∀y Likes(y, x) ^ ¬Likes(y, ¬x) ^ ¬Likes(¬y, x)

s9: ¬Likes(Jin, Armageddon) (from s8 by and elimination where y = jin, x = Checker)

s11: ¬Likes(Dimitr, Armageddon) ^ ¬Likes(Raj, Armageddon) (and elimination from s1 ^ s2)

s12: ¬Likes(¬Budda, Armageddon) (from s11^s9 ⇒ ¬Likes(¬Budda, Armageddon))

s13: Likes(Budda, Armageddon) (from s8 by and elimination)

(e)

s14: ¬Likes(Jin, Tetris) (from s8 by and elimination where y = Jin, x = Checker)

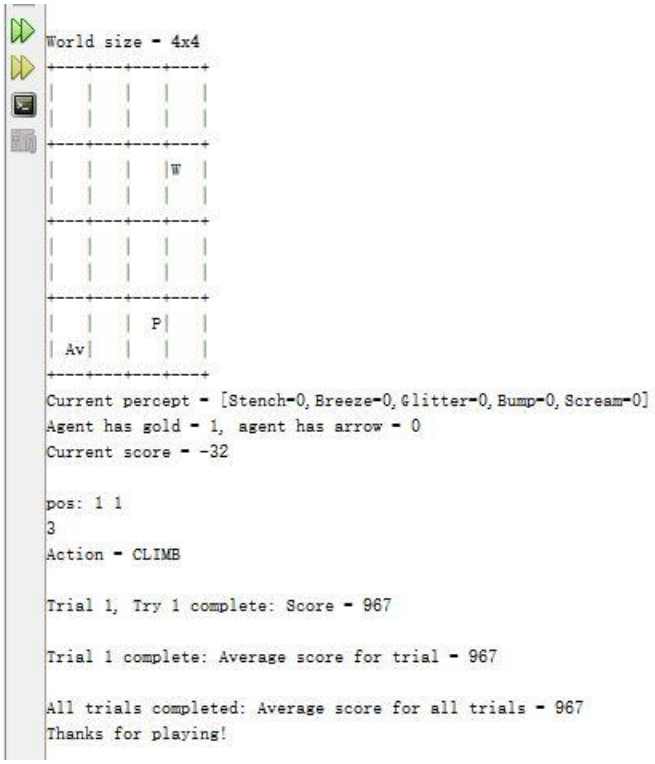
s15: ¬Likes(Budda, Tetris) (from s8 by and elimination where y = Budda, x = Armageddon)

s16: ¬Likes(Dmitri, Tetris), (from s2 by and elimination)

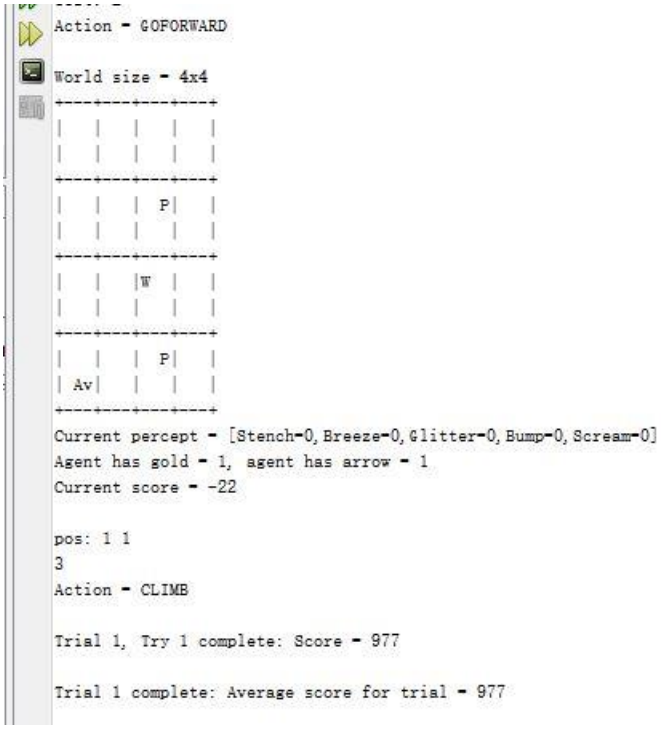
s17: ¬Likes(¬Raj, Tetris) (from s16^s15^14 ⇒ ¬Likes(¬Raj, Tetris))

Programming Part:

Run #1 result:

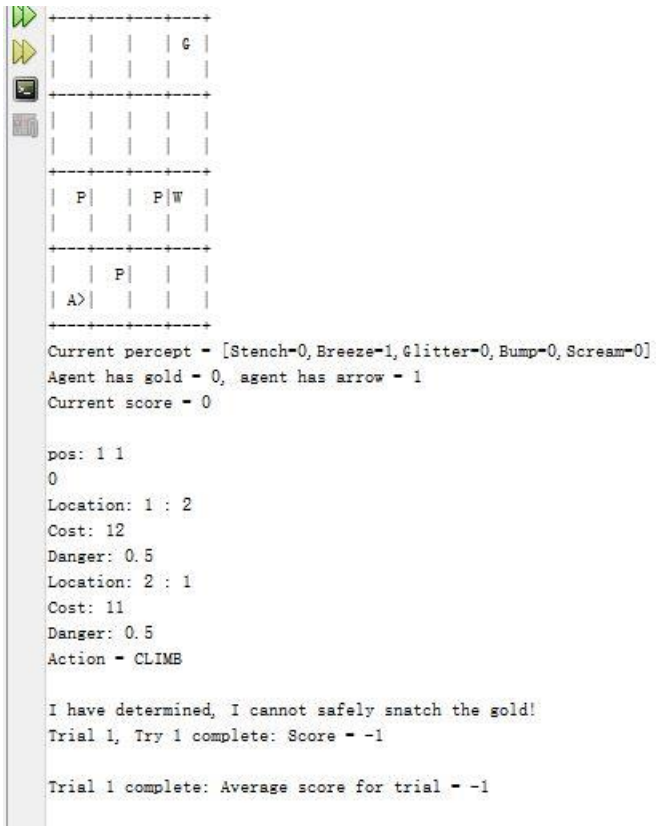


Run #2 result:



```
Action = GOFORWARD

World size = 4x4
+---+---+---+---+
|   |   |   |   |
|   |   |   |   |
+---+---+---+---+
|   |   | P|   |
|   |   |   |   |
+---+---+---+---+
|   |   |W  |   |
|   |   |   |   |
+---+---+---+---+
|   |   | P|   |
| Av|   |   |   |
+---+---+---+---+
Current percept = [Stench=0, Breeze=0, Glitter=0, Bump=0, Scream=0]
Agent has gold = 1,  agent has arrow = 1
Current score = -22

pos: 1 1
3
Action = CLIMB

Trial 1,  Try 1 complete: Score = 977

Trial 1 complete: Average score for trial = 977
```

Run #3 result:



```
+---+---+---+---+
|   |   |   | G |
|   |   |   |   |
+---+---+---+---+
|   |   |   |   |
|   |   |   |   |
+---+---+---+---+
| P|   | P|W  |
|   |   |   |   |
+---+---+---+---+
|   | P|   |   |
| A>|   |   |   |
+---+---+---+---+
Current percept = [Stench=0, Breeze=1, Glitter=0, Bump=0, Scream=0]
Agent has gold = 0,  agent has arrow = 1
Current score = 0

pos: 1 1
0
Location: 1 : 2
Cost: 12
Danger: 0.5
Location: 2 : 1
Cost: 11
Danger: 0.5
Action = CLIMB

I have determined,  I cannot safely snatch the gold!
Trial 1,  Try 1 complete: Score = -1

Trial 1 complete: Average score for trial = -1
```

Average score = (967 + 977 – 1)/3 = 647.67