Artificial Intelligence - Homework 1

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1. **Tennis against the wall**:
   Performance measure: Keeping good form
   Environment: Wall, racket, ball
   Actuators: Human body
   Sensors: Eyes, ears
   And it is deterministic, sequential., static, discrete, fully observable and Single agent

Digikala site:
Performance measure: Easy to explore, being fast to use
Environment: Browser
Actuators: keyboard, mouse
Sensors: Monitors
And it is Partially observable, stochastic, sequential, dynamic, discrete, multi-agent

2.

a. Playing soccer agent: **Goal Based**. Why? because a Playing soccer agent is only concerned about having more score in the game, it will sense the environment and perform actions to score more.

b. Exploring the subsurface ocean of titan agent: **Utility Based (or maybe learning agent)**. Why? because an Exploring the surface ocean of titan agent will need to take the actions based on the how clearly it can measure the surface of the ocean and based on that it can change it's actions to make it more "happy".
c. Bidding on an item at an auction agent: **Utility Based**. Why? Bidding in an auction it has to store information about what is the current bid, and

how "happy" it will be if the bid price goes up/down and based on these it'll make decisions.

3.

1. **CBAC**, because it's the shortest right answer

2. **AAACCC**, DFS search will expand states in alphabetical order: A, AA, AAA, . . ., AAAAAAAAAA, AAAAAAAAAB, AAAAAAAAAC, AAAAAAAAB, AAAAAAAABA, AAAAAAAABB, AAAAAAAABC, so DFS search will return the correct password that sorts first alphabetically: in this case, AAACCC

3. **BABAB** has the lowest cost (8) among the six goal states listed, so it will be returned by uniform cost search. All of the other correct passwords have higher cost

4.

1. Breadth-first search:

States Expanded: Start, A, B, C, F, D, E, Goal
Path Returned: Start-C-Goal

2. Depth-first search:

States Expanded: Start, A, C, D, B, E, Goal
Path Returned: Start-A-C-D-B-E-Goal

3. Iterative deepening search:

States Expanded: Start, A, B, C, F, D, E, Goal
Path Returned: Start-A-C-Goal

4. Uniform cost search:

States Expanded: Start, B, A, C, E, D, Goal
Path Returned: Start-C-Goal