a)

Robots play soccer. The task environment is (usually) fully observable via sensors on the robot (though from personal experience they're usually notoriously unreliable). By the nature of the game, the environment is multi agent, stochastic, sequential, dynamic, and continuous. The rules of the game are set, so the robots operate in a known environment.

Agent Type: Soccer Robot

Performance Measure: Goals scored, ball possession time, acquisition speed

Environment: Soccer _field, other robots, soccer ball

Actuators: Motors for steering, movement, and kicking

Sensors: Infrared (usually for the ball), motor encoders, direction sensors, ultrasonic distance sensors

b)

Netix/Amazon on-line recommendation system. The task environment is partially observable, so it is necessary to keep state information about a user's previous choices. The recommendation system operates as a single agent. Because it interacts with a human as a feedback mechanism, the environment is uncertain, episodic, static, and discrete. Human preferences can vary according to other factors, so the environment is unknown.

Agent Type: Recommendation System

Performance Measure: User engagement, retention, and click-through

Environment: The collection of possible shows a user can watch

Actuators: Interface where suggestions are displayed

Sensors:
User clicks, mouse movements, and engagement

(c)

Expert system for medical diagnosis. The task environment is partially observable since it is not feasible to have all the data on a person at any given time. The system is single agent and interacts with a stochastic, sequential, dynamic, continuous, and unknown environment.

Agent Type: Recommendation System

Performance Measure: Diagnosis accuracy and patient resolution accuracy

Environment: The symptoms, medical history, and predispositions of a patient

Actuators: Interface where diagnoses and suggestions are displayed

Sensors: Database of patient data, x-rays machines, MRI scans and other tests performed on the patient