Part 2 Task 1:

One real-world example that can be formulated into a Markov decision process is driving. The state space in this example would be the roads. The action space would be a distribution of different maneuvers you make while driving. This includes turning left, turning right, stopping, accelerating, parking, reversing, and much more. Due to the environment of the road being reliant on your actions as well as others' actions, the environment is stochastic. This is to say during the transition state, you are considering your policy (your brain) as well as the changes in the state. The reward would be not crashing or harming any of the people around you in the environment. This is pretty general and could be quantified through sensors of the car or even your brain.

Part 2 Task 2:

One realm where reinforcement learning could be utilized is scheduling in healthcare. This could be patient scheduling or even O.R. scheduling. This paper, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7349722/, explores how Deep Reinforcement Learning could be used in the Emergency Department for patient scheduling. Some key points are that the environment is dynamic, and the decisions made by an agent are chosen from a neural network. The agent then learns iteratively and develops the optimal policy which is then applied to the E.D.. A part of the decisions that an agent makes have a lot to do with the data about a patient. This includes age, sex, arrival time, and much more. Medical resources available also play a large part in this. Using all this data, and based on the ANN's decision, a reward is given and the policy is optimized through gradient descent.