**Task 4**

* Understanding the code: The code directory gym/gym/envs/classic\_control/pendulum.py implies that the environment accomplishes small scale tasks (environment type is named classic\_control)
* The state of pendulum is described by a class “Pendulum” containing information related to its angular position from the vertical line, its speed and moment acting on it.
* Attribute action\_space and observation\_space are box type spaces having dimensions (1,)

and (3,) respectively

* In step function th and thdot indicates the angular position and speed of pendulum at a particular instant of time.
* The velocity after a time dt is calculated (taking into consideration effect of gravity and other factors) and stored in newthdot variable while angular position after dt time is stored in newth.
* Function \_get\_obs return a NumPy array containing information about angular position(in terms of cos and sin) and angular velocity.
* The reward function:

Costs=angle\_normalize(th)\*\*2 + .1 \* thdot \*\* 2 + .001 \* (u \*\* 2)

Here u is the torque acting on pendulum while angle\_normalize (th) is the angle from mean vertical in range of -180 to 180 degrees.