Abstract—In this project, we are going to build legs of an adult-size humanoid robot. In our design, the legs use a connecting lever structure that works similarly to the human muscle to deliver the force. The heavy hip approximate to human’s core muscle group, it can be used to support the upper-body, keep balancing, drive the legs and reduce the load of the lower limbs. Eventually, the robot has lightweight legs and easy control center of mass.

Intruduction
The final goal of this project is to build an adult-size humanoid robot, which qualifies for the adult-size RoboCup humanoid league in the future.[1] However, here, we only focus on the legs and the hip part of the robot. Because having strong and balancing lower limbs are the foundation and the most important condition for a big humanoid robot.

Overview of structure
1. Light weight and a concentration of the weight in the center of the body
2. Using connecting levers to deliver the force
3. Low cost design

Conclusion
Figure (3) is the result of our testing, the robot can walk successfully. The speed is slow and not very efficient. The foot plane can't rise in a high altitude, and the distance of one step is short. Once the swing leg is landing, the center of mass of the robot will present a forwarding inertia force. Without the help of upper-body, the robot will be unstable for a short time, (around 2 seconds) after finishing one step.

References