



İZMİR
KÂTİP ÇELEBİ
ÜNİVERSİTESİ

2010

PROJECT:

DESIGNING AN AUTOMATON

Group Members:

1-)Nurettin Uğur ALAGAŞ 160412010

2-)Batuhan YALÇINKAYA 160412020

INSTRUCTOR:Erkin GEZGİN

AUTOMATON:

Automata is a self operating machine. It has a mobility so it is a mechanism. It automatically performs cyclic operations. That means a machine which performs a range of functions according to a predetermined set of coded instructions. Its mobility is one. In this way its degree of freedom is 1. So one input (actuator) enough for an automaton. An automaton is a mechanism that can perform multiple movements with the help of a crank or motor. Also a moving mechanical device made in imitation of a human being. It is used in comparisons to refer to a person who seems to act in a mechanical or unemotional way.

CONCEPT:

At this Project, we designed an automata. This automata has some properties. For example, its degree of freedom is 3, it has to have six outputs also one input and one mobility since it is already an automata. According to these properties we decided to design a basketball player automaton. This player will walk and bounce the ball same time. At this concept our 4 outputs are from legs. When we give the input, the player's legs will move the reverse. When one leg moves forward other leg will move to back. Also legs will move up and down. Also we have 2 outputs from one arm and finally one from ball. For walking we use some mechanisms. These are four bar and slider cranks. These mechanisms will connect to shaft and each other. Also we designed two gear mechanisms for moving the arm and bouncing the ball. At this gear mechanism we use 2 gears and 1 slider crank.

MECHANISMS:

1)Mechanism For Walking:

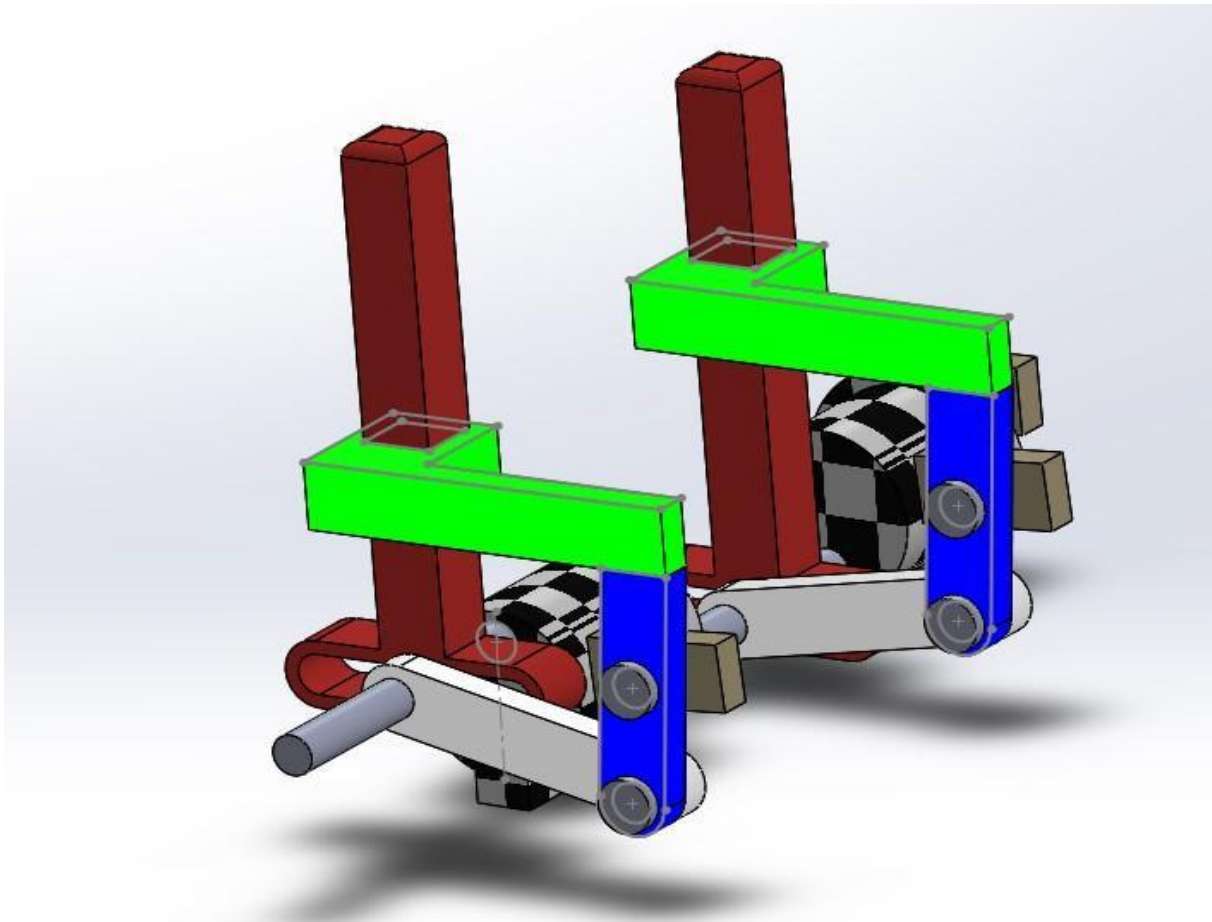


Figure 1- Mechanism For Walking

At this part we have 2 slider crank and one four bar mechanism. While we are designing mechanism we thought that How a human steps. Then we designed the T part. Because one leg will up and down. So when we turned the shaft the part will move up and down. So we connect a prismatic joint to the T part. In this way T part will move up and down freely. For moving the T part forward and back, we designed a four bar mechanism. With 4 bar mechanism we connect the shaft and T part. In this way T part will move forward and back. When walking the legs are moving reverse. So for giving this motion we assembled the shafts with 180 degree angle difference. That's way the leg's motions are different each other.

2-)Gear Mechanism

A)For Moving Arm:

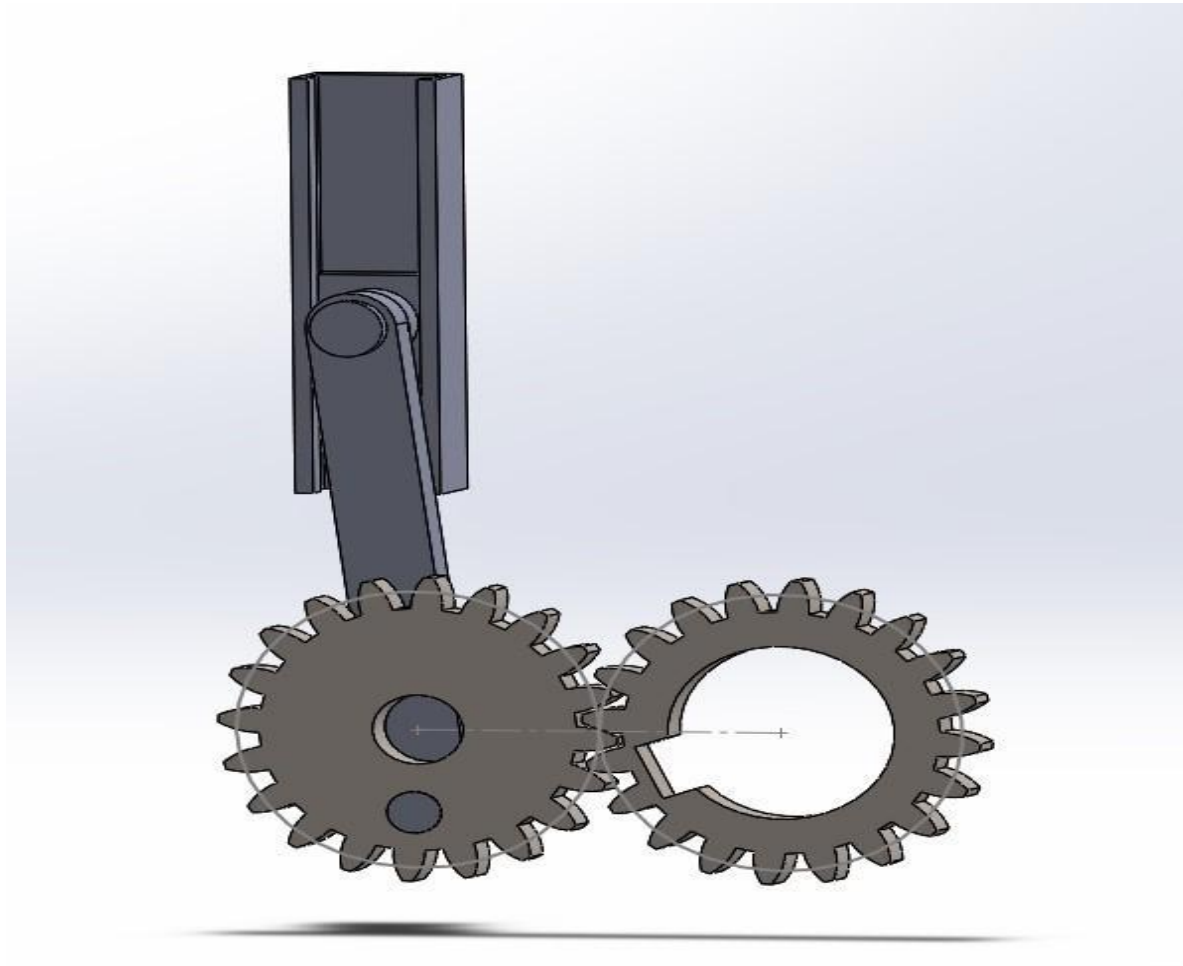


Figure 2-Gear mechanism For Moving arm

For moving the arm we designed a gear mechanism. At this mechanism we used gears and slider crank. We assembled the first gear and our shaft. For this we opened a wedge at the gear. And we open a hole at second gear and we assembled the link of slider crank and gear. So when we turned the shaft first gear will turn and second gear will turn. And in this way link will move. When the

link moves, There will be a slider crank mechanism at there. At the result ball will move up and down.

B)For Moving Ball:

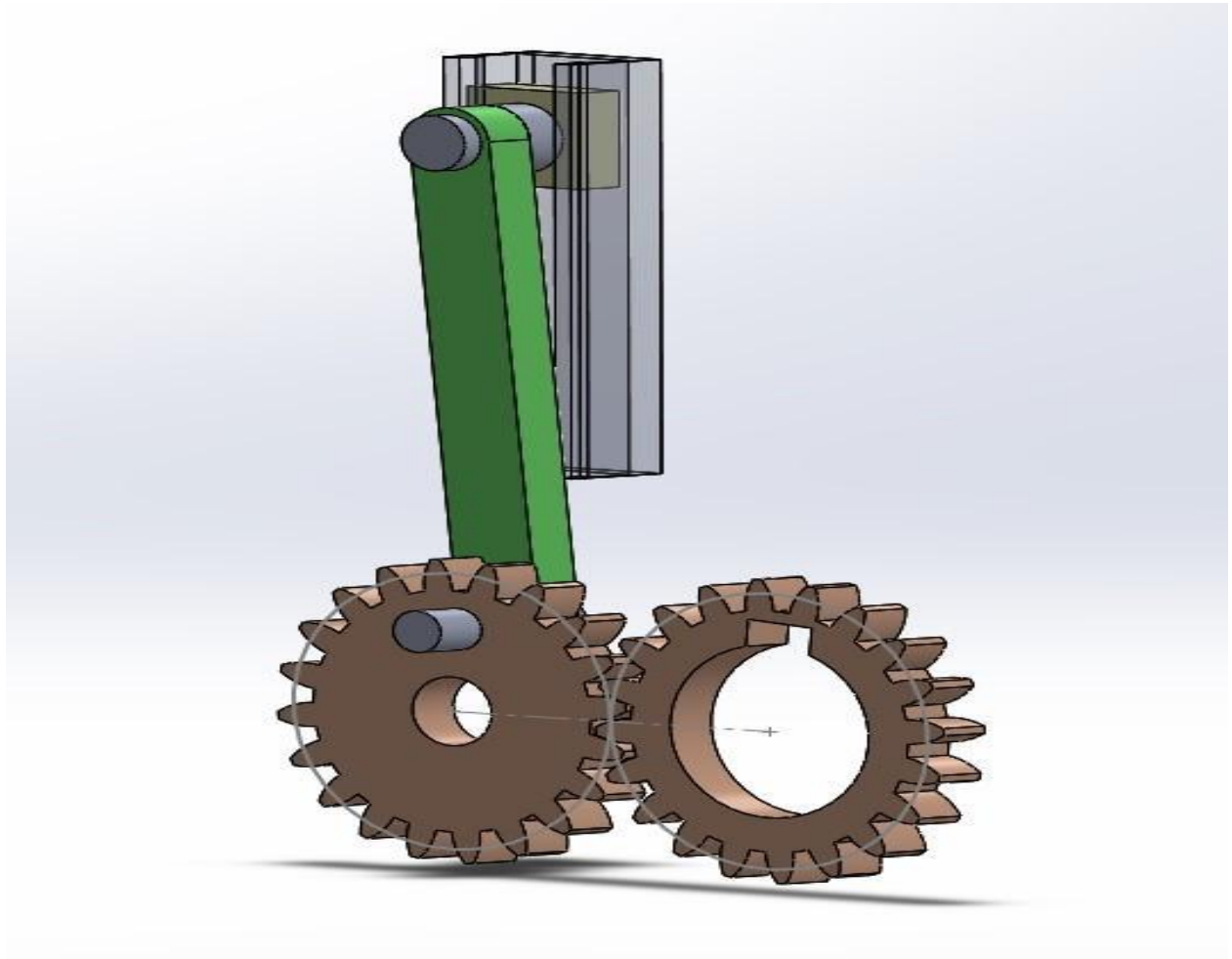


Figure 3-Gear Mechanism For Bouncing Ball

We will use same mechanism for bouncing the ball. But at this mechanism our gear's radius are different from other mechanism which is for moving arm. Because the slider crank of this mechanism's S value will be different from mechanism for arm. For assembly we applied same procedure. We assembled the first gear and our shaft which input will give from there. and we opened a hole at second gear. And we connected the our slider crank and our second gear at there. So all mechanism is assembled each other.

CONCLUSION:

At this Project We designed a automata. Firstly we learned What is automata and how it Works. Automata is a machine which repeats the same motion continuously. Automata's mobility is equal to one so one input (actuator) is enough for automata. For designing a basketball player automata which is walking and bouncing the ball we did some calculations. These calculations are mechanism's geometrical and algebraic analysis and velocity analysis. While we were doing the calculations we strengthened and refreshed our information about subjects. Also we learned some tricks about calculations. After calculations we decided on the length of parts. And finally We printed the parts and we assembled the parts each other.