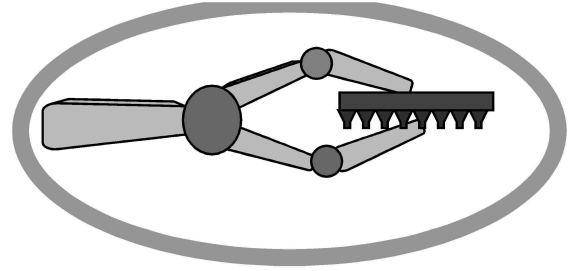


One Hour Robot #1

Pekka Ritamäki email: pri@sci.fi

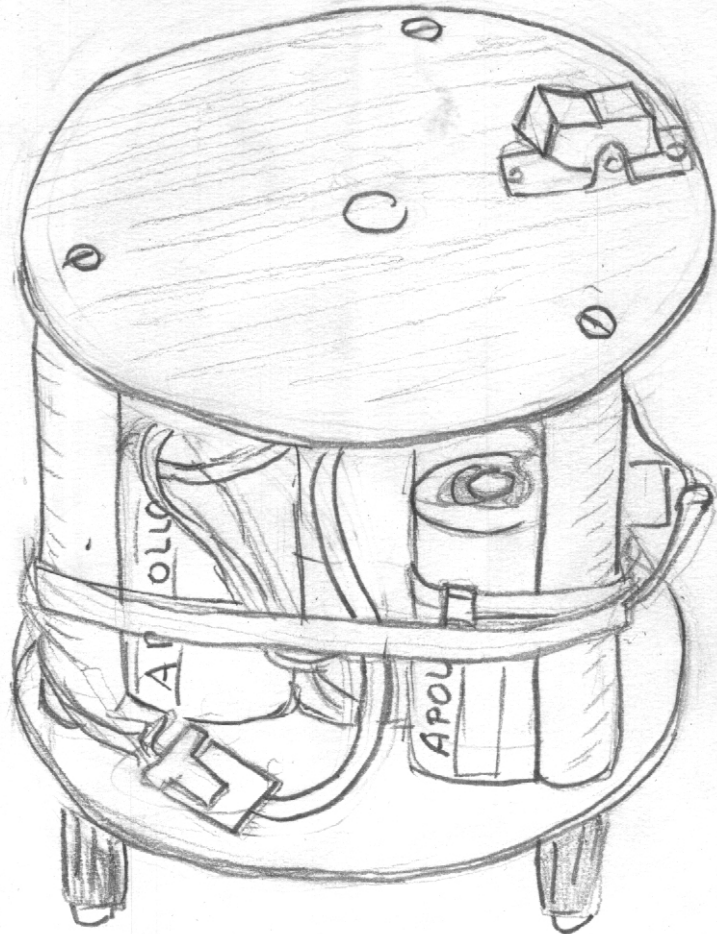


Robot Association of Finland

What is a robot?

At first meeting of Finnish Robot Association we were talking what is a robot. Everyone have a different answer, but as a conclusion we thought a robot as **a machine which replaces human work in production.**

Normally robots are expensive and some robots have mechanical movements, but not all. Some robots are called automation machine, because they do not have moving hands. A complicated measuring automation machine may be much more complex than some packing robots which has some kind of hand.



What is a home robot?

How about a home robot? Which kind of production is done in home? Kids? No, there is no robots for that yet. Still we have many complicated robots in home. A washing machine, a dishwasher, a theatre (TV), a messenger boy (phone + Internet), a horse and carriage (car), a servant who looks house warming (electricity and oil) and keeps food in cold place (icebox). These robots are so common that we do not think that they are

robots at all. They replace a human work at home although they do not produce products which we can sell.

Still a home robot is thought a small machine which move in a floor and avoids obstacles. We do not want to make a washing machine but robot which moves.

Home robot problem

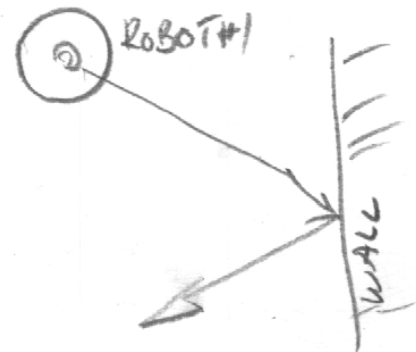
A home robot must move and avoid furniture.

This requires a motor, a battery, a mechanical construction, a brain, sensors etc. It sounds expensive and complicated. How many

computers do we need? How many machining tools I shall need? What kind of gears are needed? How about steering

equipment? There seems to be too much of obstacles to a normal people to build robot

what do not produce anything, but is only made for fun. The robot needs electronics skill, programming skill, mechanical construction skill, design skill. How many have them all? All these things are also expensive, do we have money to buy all the material.



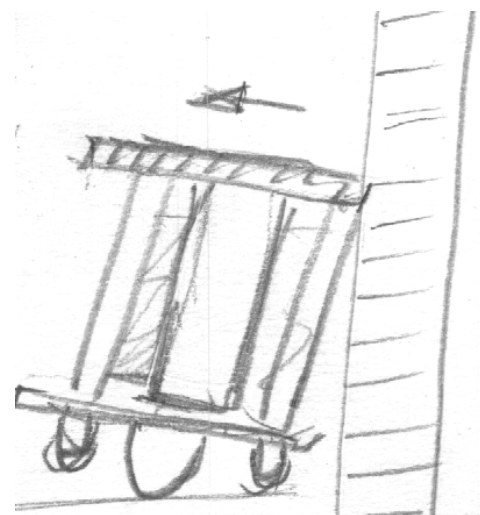
An one hour robot?

How about if you build a robot in one hour with parts which are laying around? It can move to any direction and avoid obstacles. It

sounds impossible? No, read on. You need an old tape recorder motor, two round printed circuit boards and four chargeable 1.5V batteries, a switch and some wire.

Basic idea is to install the motor to vertical direction and put rubber top on the motor pulley. If you do not find a suitable rubber

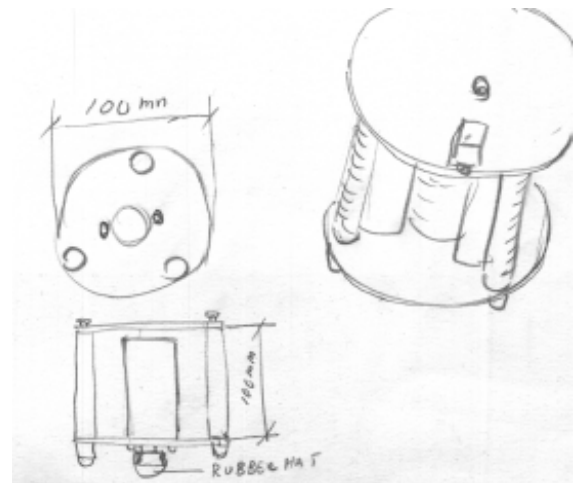
part, you can put shrink tube on the pulley. Three supporting rods a little shorter than motor pulley, so that your robot leans to one side. When the motor works it moves to direction where robot is leaning. When the robot



bumps into a wall, the balance is moved to opposite direction and robot moves away from the wall.

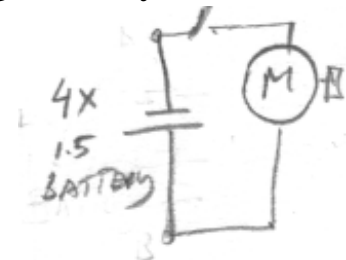
Part list

- A 6V motor with a two fitting screws (old tape recorder motor)
- Two empty PCB-boards 100*100 mm (4 " * 4")
- 3-4 NiCd 1200mA batteries or standard A size alkaline battery cells according motor voltage
- battery switch from tape recorder
- three polyethylene rods, approximate 10*130 mm (1/2"* 5") or three ballpoint pens, with a shoulder end
- some plastic ties
- wires, solder, hot glue



How to build an one hour robot

The most difficult part is make round PCB-boards. Make round markings to PCB-board and use tools what you have to make it round. A jigsaw, a knife, a file or a lathe are suitable tools. Drill holes for supporting rods, motor pulley and fixing screws. The supporting rods should be a little shorter than motor pulley. Leave rods however longer than you think and later cut them to right length. Fix the batteries to rods with plastic ties and hot glue. Put the main switch on top of robot. The robot pulley must have a good friction to ground. It needs some kind of rubber cap. I found a suitable cap from microphone support from old telephone. Try to balance batteries so that robot moves easily from side to side.



Ready to go!

Put the Robot #1 to floor and switch on. If batteries are in good conditions, the Robot #1 moves sliding directly sideways. If the pulley rubber is not very smooth, the robot makes all kinds of sidekicks. When it hits people, it bumps to other direction. It may need some adjustment of batteries to balance operation.

What next?

A sound robot

There is numerous possibilities to improve your Robot #1. You can make sound using a speaker and capacitor in parallel with motor. The battery needs then a series diode.

A solar cell robot

You can put a small solar cell, which charges the battery. You may need to put some voltage control to connect motor on only when there is enough battery voltage.

A light sensitive robot

You can put a light sensitive resistor to a robot and it works only in dark.

A puppet robot

You can dress your robot like a Father Christmas and give it as Christmas present.

