Design Document

One sheet for each team of 5 people for the project to be sent to Anuradha Shankar/Krishna Kumar   by uploading in drive provided by Prof Arvind Ajoy by **3 Sept 2018**

1. **Project code and team number**:
   CIP201801/team13_____(for eg. CIP201801/team 1)
2. **Name of Project**   Blind man stick
3. **Name of Team members and specify who is your leader**
   a) Leader: Vishesh Munjal
   b) Jayant Suresh
   c) Subhash .s
   d) Devendra Singh
   e) Yogita Reddy

4. **Solution idea**

   a. Using a simple circuit to detect water.

   b. Use of pressure to differentiate between hard & soft objects.

   c. our main goal is achieve object detection by pressure using a push button as a key (please refer to circuit diagram) .

   d. in order to differentiate between hard and soft we will use syringes which when come in contact with the hard object are compressed where as in case of soft object due to less total pressure the syringes won't compress or would compress to little extent . syringes contains electrolyte water in them which on compression goes through pipe and completes the circuit .(refer diagram and procedure).

5. **Assumptions**

   1. On applying same force on a particular object the magnitude of pressure will be different particularly in the case of hard and soft material. Hence we may be able to differentiate between hard and soft using pressure.

   2. Water bodies conduct electricity hence it might be able to detect water.

   3. when come in contact with the hard object are compressed where as in case of soft object due to less total pressure the syringes won't compress or would compress to little extent.
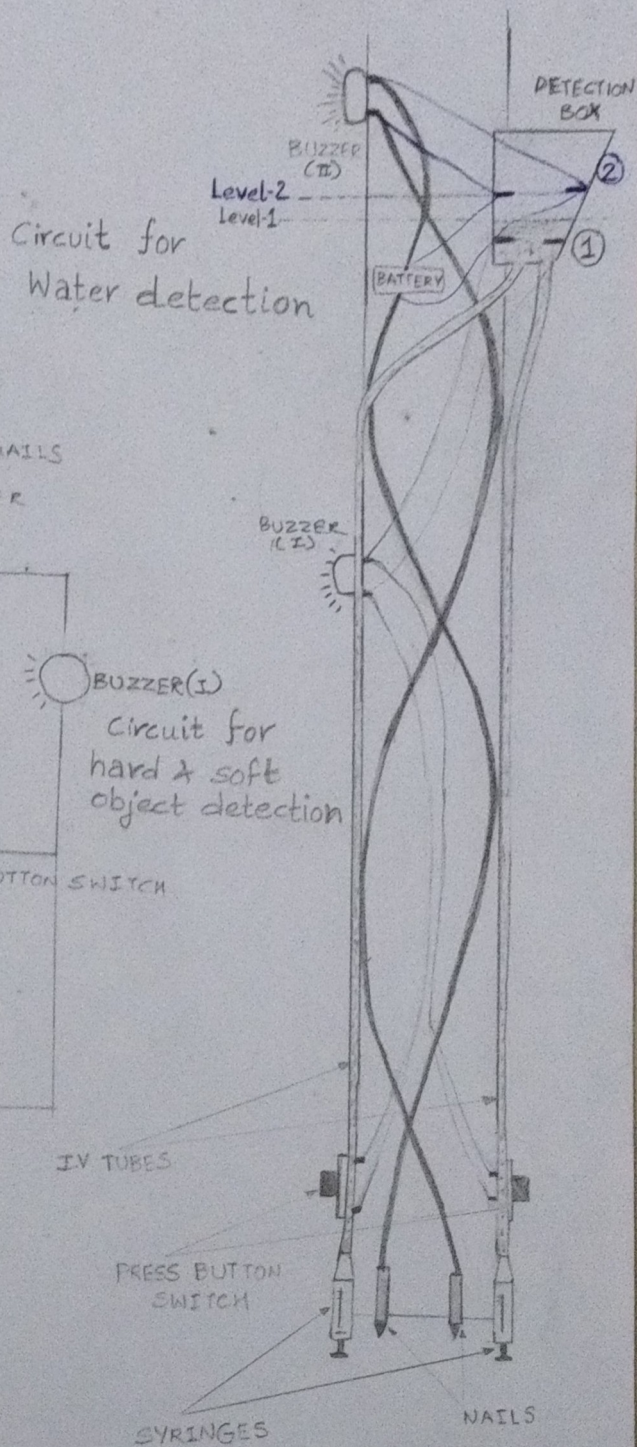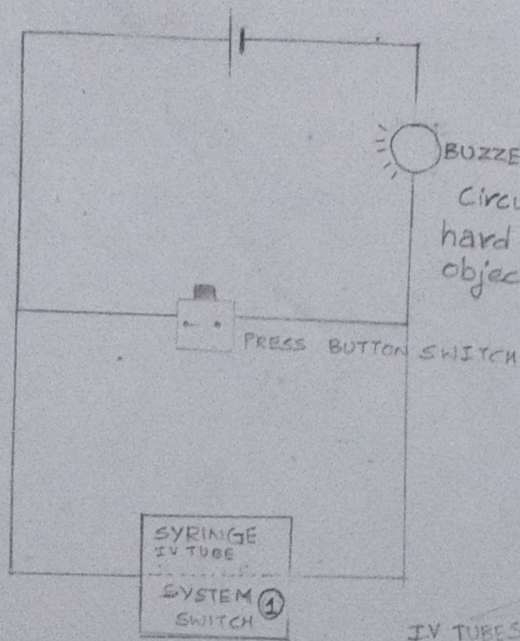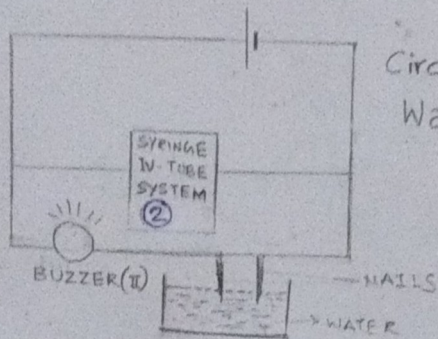6. **Constraints**

1. Press button might get short-circuit on coming in contact with the water as it should be in the bottom most of rod in order to detect the pressure.
2. Buzzer should give different sounds on coming in contact with different objects, achieving that with a single buzzer is a constraint.
3. Syringes if not correctly fixed might be damaged on applying pressure. Moreover it would ruin the project if electrolyte couldn't reach the circuit completion box.

7. Drawing of solution (to scale and please provide a floor plan) on Annexure A

8.   What are the materials you are going to use and what facilities/ tools are needed(Annexure B)?   9.   Process of components /Assembling/ Testing (Annexure C)

Annexure A(drawing)

Circuit for
Water detection

SYRINGE
IV-TUBE
SYSTEM
②

BUZZER(Ⅱ)

—NAILS

→WATER

BUZZER(I)
Circuit for
hard & soft
object detection

PRESS BUTTON SWITCH

SYRINGE
IV TUBE

SYSTEM ①
SWITCH

DETECTION
BOX

BUZZER
(Ⅱ)

Level-2
Level-1

②

①

BATTERY

BUZZER
(I)

I.V TUBES

PRESS BUTTON
SWITCH

SYRINGES

NAILS

Annexure B (Materials and facilities)

1. Electric wire
2. Buzzer
3. Spring
4. Sponge
5. Cellotape
6. Glue
7. Thermocole
8. Plastic Bag
9. Thread
10. Twine
11. Gl wire
12. Switch
13. Box cutting Knife
14. Scissors
15. Aluminum Pipe
16. Nails
17. Nuts n bolts
18. Feviquick
19. Paper fasteners
20. Press button switch
21. Battery
22. Cardboard
23. Plastic bottle
24. Aluminium can
25. Tubes(iv tubes)
26. Resistor
27. Tub of water for testing (at testing station)
28. Drill (at work station)

Annexure C (Process)

Process of components /Assembling/ Testing (Annexure C)

Construction

- Our system contains 2 circuits. The construction of circuits is as such that one circuit is used for water detection (as shown in figure 1).
- Water detection circuit also has the syringe iv tube system 2 attached in parallel.(as shown in figure 2)

- The other circuit contains syringe iv tube system 1 as well as push button attached in parallel to   the same buzzer.
- Resistors of different resistances are used in order to control the intensity of sound given by buzzer.
- In water detection the nails are used in order to complete the circuit as soon as they come in contact with water. Hence works as key.

Working

- In case of water detection circuit it is assumed that as soon as nails come in contact with water they would act as a key and circuit would get complete which in turn is going to produce a sound in buzzer.
- In case of object detection the push button might tell about any sideways object. But the main object detection work is done by syringes iv tube system. in this system the two syringes are placed in the bottom of the stick these contain an electrolyte solution (basically a salt solution) which on compression of syringes by any object would go through iv tubes into the "syringes iv object detection box" which is basically a switch if we closely look at it contains 4 nails (small pins as wire extensions) these have 2 pins at same level and the other two pins also at the same level with respect to each other but above the other two pins. When a soft object comes in contact with the syringes it basically compresses the syringes up to a little extent such that only a small amount of electrolyte would go into the box and activate system one which would make one buzzer go off and while encountering a hard object due to more compression more electrolyte would reach the box and activate system 2 which makes the second buzzer go off at that instant both the buzzer would sound differentiating between hard and soft object.
- After the pressure is removed the syringes with the help of springs would regain their original position making the electrolyte go back into the syringes and thus there would be no electrolyte left in box hence no conduction between nails leading to reset of system.