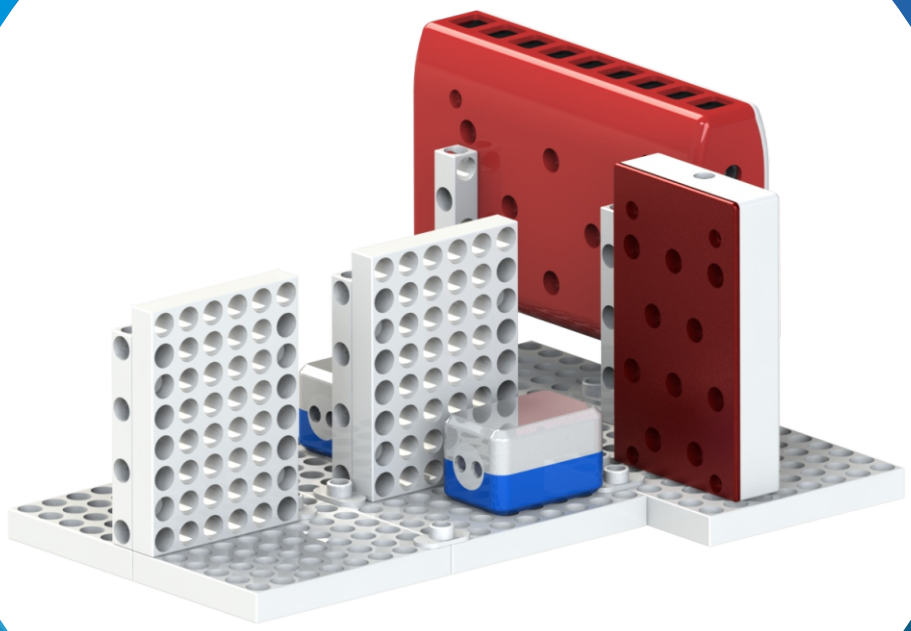
roboX

An Experiential Learning Package



Visitor Counter Mechanism

WORKSHOP

VISITOR COUNTER MECHANISM

Introduction:

Many a times it is useful to have a mechanism which can count, monitor and display the number of visitors entering/leaving a particular room/hall or a public place. This can be achieved by a bidirectional counter. It is a counter which increases the count when a person enters the room and reduces the count when a person leaves the room. The LCD monitor can display this number dynamically.

This system is helpful for counting the number of people present in an auditorium or halls for seminar at a given point in time to avoid congestion. It can also be used to check the number of people who are attending an event or to count number of visitors for a particular exhibit at a museum.

Today's Agenda

To build a simple counter that counts the number of visitors entering or exiting a given room or any other place when this circuit is installed at the gates and display this number on the screen.

Session Plan

- Introduce today's agenda to the class
- Make students to answer the pre-activity questions listed below
- Show a video of visitor counter mechanism. The video is targeted to give students a rough idea of the mechanism
  (Link: https://www.youtube.com/watch?v=XDy9J87W7SI)
- Explain the concept of visitor counter Mechanism
- How and where will we use this Mechanism?

Session Guide

Note: Teacher will act as facilitator to guide the students to accomplish the task given in the agenda:

- Students need to be divided into groups and a leader should be chosen
- Each of the students will be asked to pick up one of the three activities, to assemble the mechanism, to configure the Robot & to write the Code
- Students are asked to assemble the visitor counter mechanism
- Students should place the sensor in the correct position such that it can detect a person entering/leaving the room
- The code to sense the person entering/leaving the room will be written by the students using ROBOGURU Software

Game-1:

The students are asked to check the accuracy of the mechanism made by other teams. The students are expected to wave their hands in front of the sensor as quickly as possible to find faults in the mechanism. Also the students are expected to check the position of the sensor placed by other team members.

This will test the sensor placement of the mechanism. The team with minimum number of flaws is considered to be the winner and is given appreciation.

Key features of the game: The student will understand the requirements to build a robust mechanism when he/she finds the flaws in the existing system. This is more like quality control of the mechanism that was built.

Fun Element

The students will find fun in testing the mechanisms made by others teams and thereby put more efforts in finding faults and issues.

Life Skills Developed

- Logic building
- Task division and management
- Programming
- Analytical

Pre-Activity Questions

Q1. What does a visitor count mechanism do?

Write your answer in this box.

Q2. Where and why do we use this kind of mechanism?

Write your answer in this box.

Q3. List the building blocks and tools required to build this mechanism?

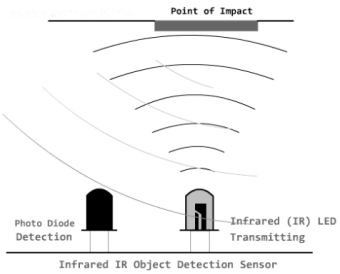
Write your answer in this box.

Students Note:

Concepts covered:

How the person is detected and how the count is incremented or decremented?

Here we are using an IR sensor for detecting the obstacles. An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings either by emitting and/or detecting infrared radiation. Here, we will be using the conditional statements to count the persons entering/leaving the room.



Exercise:

Let us build the visitor counter mechanism using ROBOX building blocks and tools.

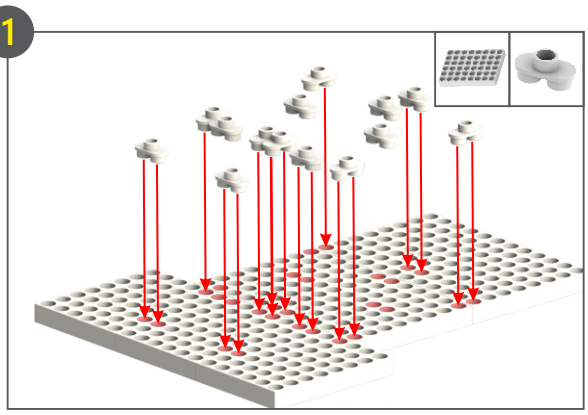
Divide the project into steps of smaller tasks and write them down with the name of the person who is going to implement it.

Task	Name

Do make sure that you strike off the tasks once they are finished.

Step by step mechanism assembling:

1



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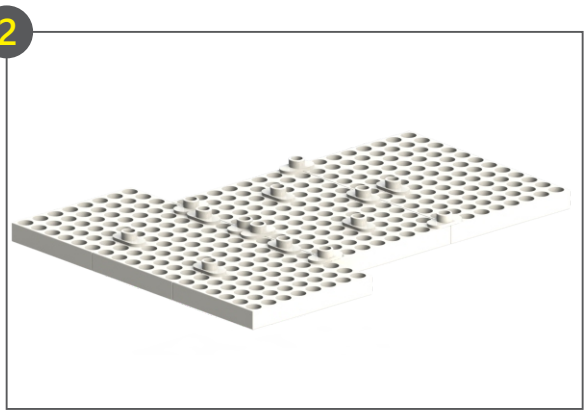

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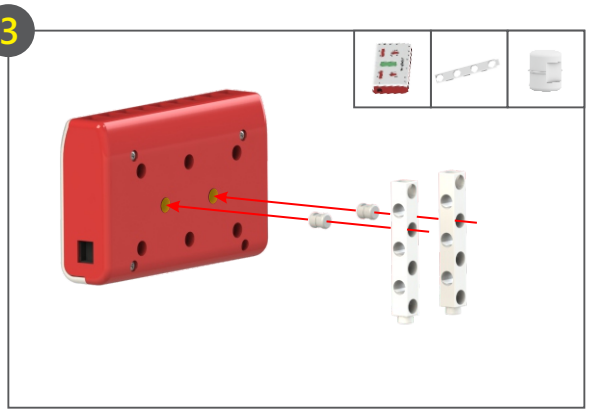

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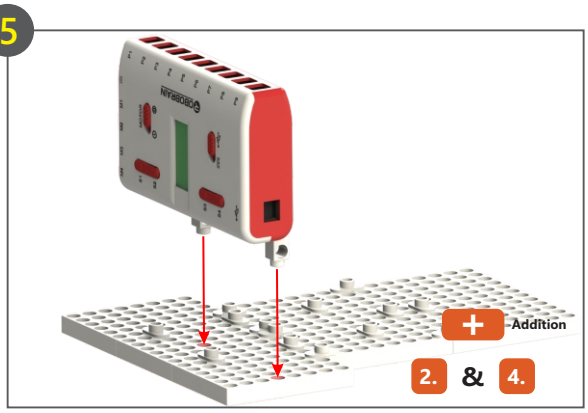

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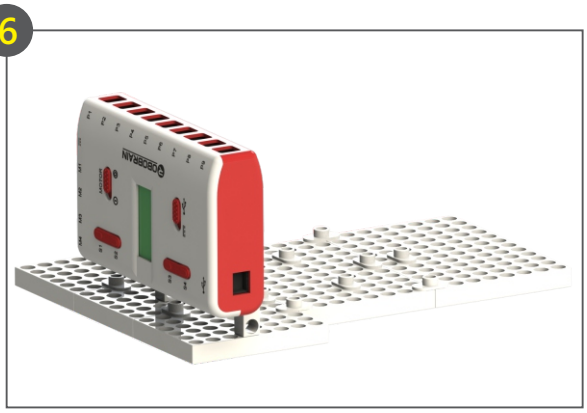

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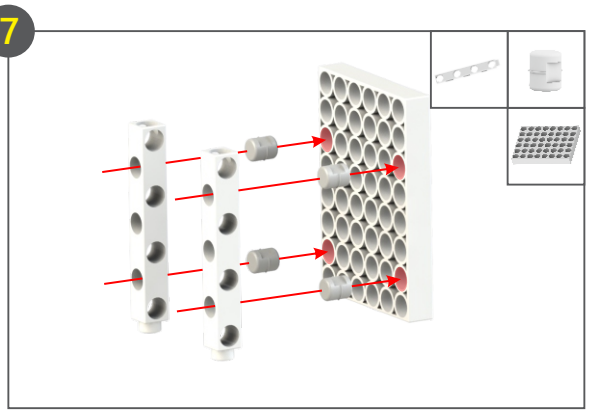

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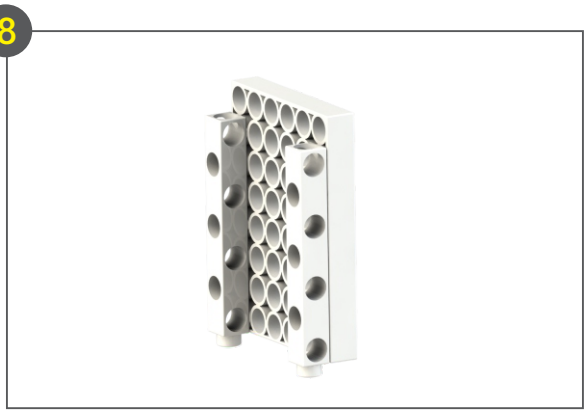

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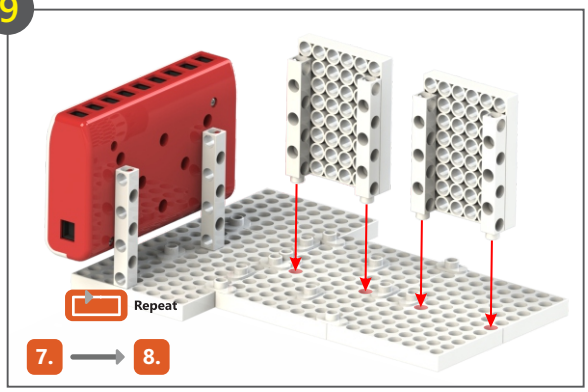

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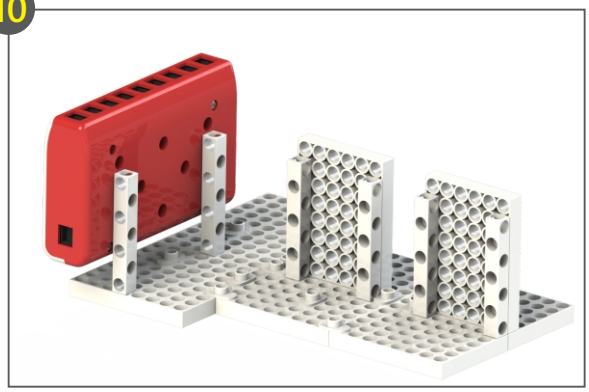

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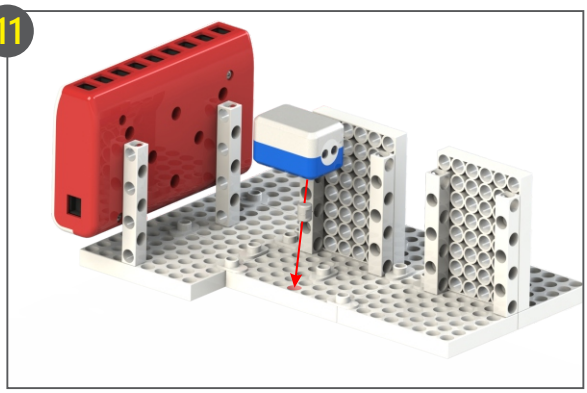

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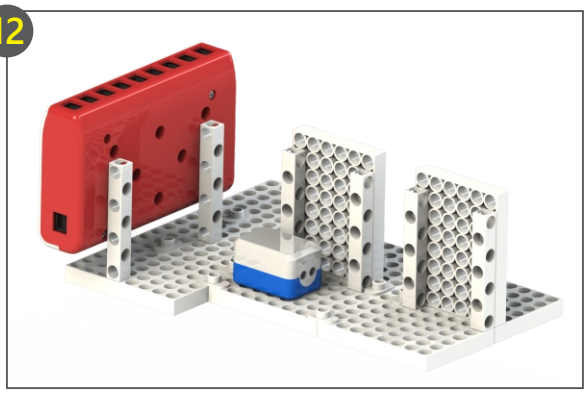

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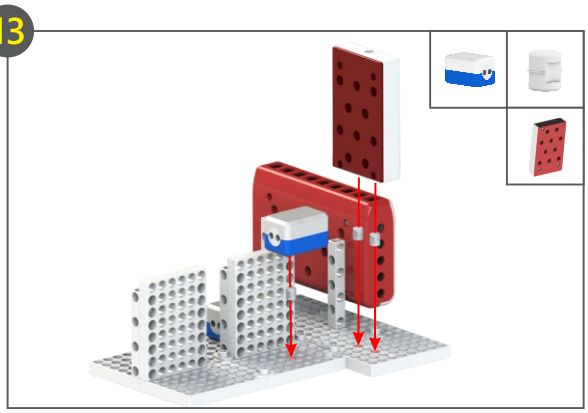

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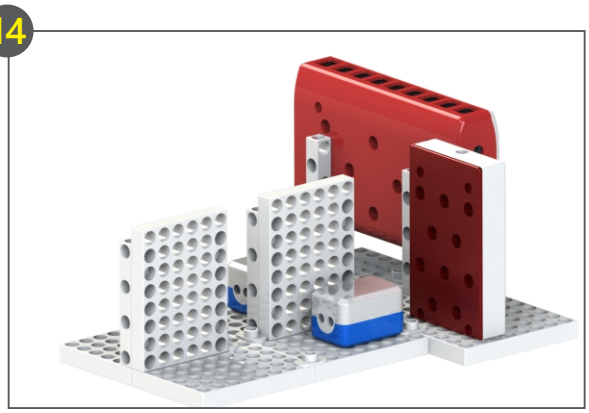


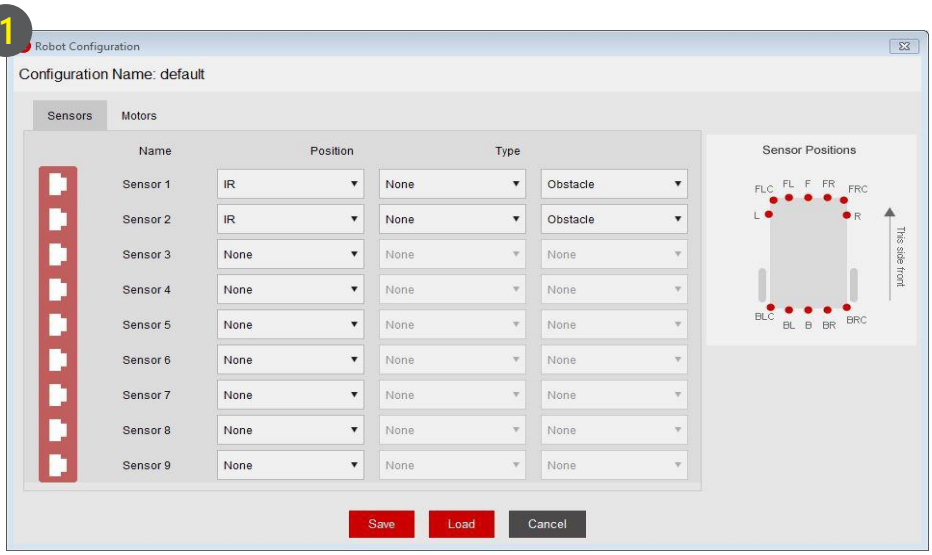
Configuring your Robot:

Hardware:

1. Power up the RoboBrain by connecting a power cable between the battery block and the RoboBrain
2. Connect the IR sensors to the sensor ports P1 and P2 on RoboBrain using the sensor cables
3. To program the RoboBrain, connect it to the laptop/computer using a USB cable

Software:

1



Sensor's configuration

2 *Write a program in code editor (Refer to next page for programming code)*

Programming:

Let's start programming the mechanism, by following the below given algorithms using ROBOGURU Software.

Step-1:

Program your mechanism to sense a person entering the room and increment the count and display the count.

- Initialize a variable
- Start the repeat loop
- Increment the variable when the person is entering the room
- Display the count(variable) on the LCD
- End the Repeat loop

Code:

```
MainStart
DIM i = 0;
repeat()
        {
        if(Sensor1_is_Active()) /*if a person is entering the room count is incremented*/
        {
        i = i+1;
        LCD_CLR();
        LCD_VAR(i);
        while(Sensor1_is_Active()) /*wait until the person enters the room*/
        {
        }
        }
        }
MainEnd
```

Step-2:

Program your mechanism to sense a person entering/leaving the room and increment/decrement the count and display the count.

- Initialize a variable
- Start the repeat loop
- Increment the variable when the person is entering the room
- Display the count(variable) on the LCD
- Decrement the variable when the person is leaving the room
- Display the count(variable) on the LCD
- End the Repeat loop

Code:

```
MainStart
DIM i = 0;
repeat()
        {
        if(Sensor1_is_Active()) /* if a person is entering the room count is incremented*/
        {
        While(!Sensor2_is_Active())
        {
        }
        While(Sensor2_is_Active())
        {
        }
        i = i+1;
        LCD_CLR();
        LCD_VAR(i);
        while(Sensor1_is_Active()) /* wait untill the person enters the room*/
        {
        }
        }
        else if(Sensor2_is_Active()) /* if a person is leaving the room count is decremented*/
        {
        While(!Sensor1_is_Active())
        {
        }
        While(Sensor1_is_Active())
        {
        }
        i = i-1; /*decrement the count*/
        LCD_CLR();
        LCD_VAR(i);
        while(Sensor2_is_Active()) /* wait untill the person leaves the room*/
        {
        }
        }
        }
MainEnd
```

Assessment Questions:

(These questions are based on the knowledge acquired by the student during the session. There are no right answers to the questions but each question is targeted to test specific life skills like Observation, Creativity & Innovation, Application oriented, Critical Thinking, Analytical Thinking, Problem Solving Math, Science, Programming, Communication, Leadership & Team skills.)

Q1. How many sensors were used to implement this mechanism?

a. 1
b. 2
c. 3
d. 4

Q2. What is the initial value of visitor count?

a. 0
b. 1
c. 2
d. Undefined

Q3. What happens to the count when a person enters from the IN gate?

a. It increments
b. It decrements
c. It will not change
d. It will give an error

Q4. What happens to the count if the person exits from the OUT gate?

a. It increments
b. It decrements
c. It will not change
d. It will give an error

Q5. What happens when a user gets in and gets out?

a. The count will be Zero
b. The count will be 2
c. The count will be 1
d. The count will be 4

If you were not a team leader answer the following questions based on your experience in this project.

Q6. Was your leader good at discussing problems faced while executing this project? (Communication and Collaboration)

a. Yes, he/she was very active
b. Yes, but we had to talk to him/her first
c. No, he/she was stubborn
d. No, he/she was shy

Q7. Did your leader treat all the team members equally? (Leadership)

a. Yes
b. He/she was talking more to his friends
c. He/she was not talking to me
d. He/she was not talking to anyone

Q8. Did your leader complain regarding lack of resources? How did you try to solve it? (Leadership, Critical thinking)

a. No, the leader was very satisfied with the skill set of the team
b. Yes, the leader compared the skill set of our team with others and made us feel incapable
c. Yes, the leader found weak points in the team and we worked together to improve the teams weakness
d. Yes, we requested for a change of leader

The person leading the team should answer the following questions

Q9. Was your team happy with all the decisions you made? (Team Work)

a. Yes, they were happy for all the decisions I made
b. Yes, but I had to convince the team members to believe in my decision
c. No, I had to impose my decisions on them
d. No, they did not accept my decisions and worked as per their own plan

Q10. Was any team member more interested in doing other members task? How did you handle this situation? (Communication and Collaboration, Critical Thinking)

a. No, all were happy and satisfied with the tasks assigned to them
b. Yes, I allowed him to help in finishing the task of his interest after the task assigned to him is finished
c. Yes, I convinced him by promising that he will be assigned the task of his interest in the next project
d. Yes, I made him do the task assigned to him and he was not very happy

Answers to Pre-Activity Questions:

Q1. What does a visitor count mechanism do?

A. *A visitor counter mechanism is used to automatically count the number of persons entering/leaving the room.*

Q2. Where and why do we use this kind of mechanism?

A. *These type of mechanism can be used in the shopping malls to count the number of customers; parties to count the number of guests arrived etc.*

Q3. List the building blocks and tools required to build this mechanism?

A. *Base Blocks, Building Blocks, IR sensors, RoboBrain.*

Answers for Assessment questions:

(Please note that answers only to the affirmative and definitive questions are provided, and as mentioned the observational and analytical questions do not have any right or wrong answers)

Q1. How many sensors should be used to implement this mechanism?

A. *2.*

Q2. What is the initial value of the count?

A. *0.*

Q3. What happens to the count when a person enters from the IN gate?

A. *It increments.*

Q4. What happens to the count if the person exits from the out gate?

A. *It decrements.*

Q5. What happens when a user gets in and a user gets out?

A. *The count will be Zero.*

Notes:

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