DAYANANDA SAGAR UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SCHOOL OF ENGINEERING

DAYANANDA SAGAR UNIVERSITY

KUDLU GATE, BANGALORE - 560068

PROJECT REPORT

ON

"SMART GLASSES FOR VISUALLY IMPAIRED PEOPLE"

2023

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE & ENGINEERING
DATA SCIENCE

Submitted by

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CERTIFICATE

It is certified that the mini project work entitled *"**SMART GLASSES FOR THE VISUALLY IMPAIRED PEOPLE"*** has been carried out at ***Dayananda Sagar University, Bangalore***, by ABHISHEK A(ENG21DS0002), ABHISHEK N(ENG21DS0003), MANOJ KUMAR B V(ENG22DS1001), bonafide students of ***fourth Semester, B.tech.***in partial fulfilment for the award of degree in ***Bachelor of Technology*** in ***Computer Science& Engineering, Data Science*** during academic year ***2023.*** It is attested that the report has been updated with all modifications and suggestions designated for internal assessment.

Signature of the Guide

Signature of the HOD

ACKNOWLEDGEMENT

Although a project's completion offers a sense of satisfaction, it is never done without acknowledging everyone who contributed to its accomplishment.. We wish to express our profound feelings of gratitude to this great institution of ours DAYANANDA SAGAR UNIVERSITY for providing the excellent facilities.

I am especially thankful to our Chairperson, **Dr. Shaila S G**, for providing necessary departmental facilities, moral support and encouragement. The largest measure of our acknowledgment is reserved for Dr. Shaila S G whose guidance and support made it possible to complete the project work in a timely manner.

I have received a great deal of guidance and co-operation from the staff and I wish to thank all that have directly or indirectly helped me in the successful completion of this project work.

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DECLARATION

I hereby declare that the Internship project entitled "SMART GLASSES FOR THE VISUALLY IMPAIRED PEOPLE" submitted to Dayananda Sagar University, Bengaluru, is a bonafide record of the work carried out by us under the guidance of Dr. SHAILA S G, CHAIRPERSON, School of Engineering, Dayananda Sagar University, and this work is submitted in partial for the awarding of the Bachelor of Technology in Computer Science and Engineering degree.

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ABSTRACT

Since current assistive devices frequently fall short of consumer expectations in terms of cost and amount of support, people with visual impairments must deal with a variety of difficulties in their daily lives.

This study introduces a brand new style of assistive smart glasses for those with vision impairments.

Using the benefits of wearable design, the goal is to help with a variety of daily tasks.

This study only provides one example application as a proof of concept, i.e., it aids visually impaired people in understanding their surroundings and directs them to avoid any type of collision with any kind of object.

Results from the experiments show that the prototype is operating as expected..

1. INTRODUCTION

- Over the years, an increasing number of people have become visually impaired. According to the globe Health Organisation (WHO), there are thought to be 285 million visually impaired persons in the globe.

- However, due to a lack of assistive technologies and financial obstacles, many workplaces and educational institutions are unable to accommodate them at this time.
- As a result, 90% of them continue to live in poverty.
- Even when new tools or technologies are made accessible, they are either prohibitively expensive or reasonably priced but only capable of performing a particular or limited task.
- The fact that wearable gadgets don't require the use of hands or only little hand use makes them the most practical of all assistive technologies.
- Head-mounted technology is the most common kind. Their primary benefit is that, unlike other gadgets, the device naturally

points in the direction of the viewer, negating the need for extra direction cues.

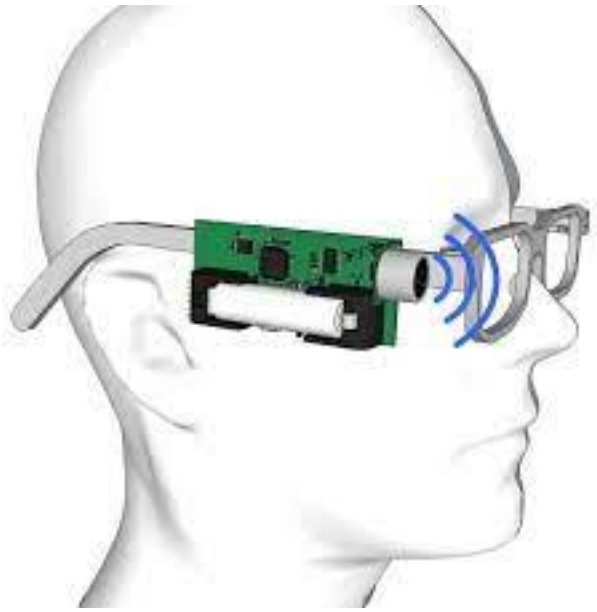
- In this study, a novel smart-glasses design is presented that can help users with a variety of tasks while yet keeping a low construction cost.
- The use of ultrasonic glasses allows us to create a clever solution to this issue. In addition, a buzzer is included within the spectacles. Following are some benefits that the smart glasses would provide:
- The system has the following features:
- buzz alert on glasses
- utilising ultrasonography to find objects
- no need to carry the system because it is mounted on wearable glasses
- and light weight.
- To create this system, the system uses two Ultrasonic sensors, an AT Mega microcontroller, a battery, clear glasses, and basic electronic components. The blind person can now use the glasses to detect impediments and send this information. To serve as eyes, the ultrasonic sensors are attached on the sides of glasses. The sensors continually emit and receive ultrasonic waves to acquire data about barriers.This information is continuously gathered by the microcontroller from the sensors.
- The microcontroller uses this information to drive a buzzer located on the corresponding side of the glasses. In order to better grasp the distance, the microcontroller reads the sensor data and then controls the buzzers in accordance with the information acquired. By using buzz notifications, this technology enables blind people to have a more thorough understanding of the barriers and things in front of each eye.

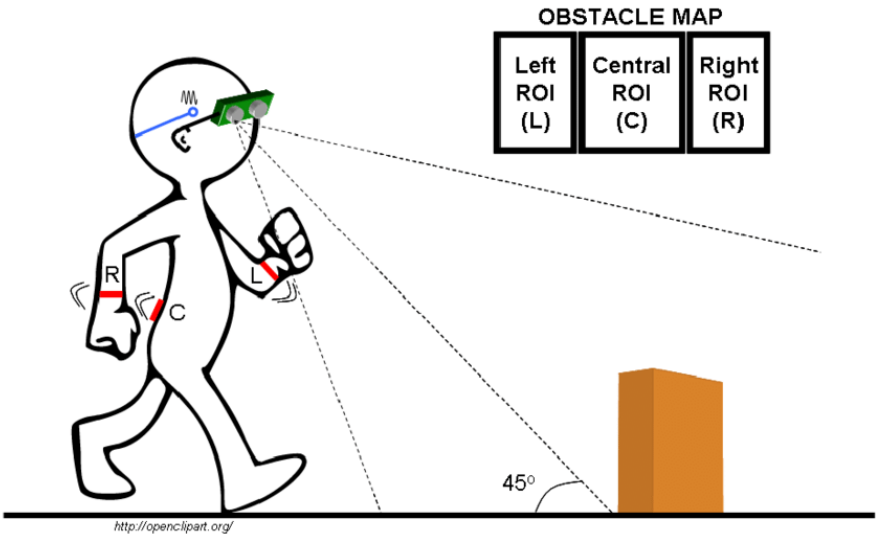
2.OBJECTIVES AND SCOPE OF WORK

- The main goal of our current work is to give blind individuals a dependable, affordable, low-power solution that will allow them to travel practically like any other regular pedestrian.
- The cost of this system makes it affordable for the bulk of society, making it an effective purchase for them to make just once and ensuring they receive excellent travel information.

3.DESCRIPTION OF WORK

The blind and visually impaired can better orient themselves with the aid of ultrasonic eyewear. Buzzers attached on the model display quasidigitally the direction, size, distance, and space distribution of obstacles located in the range of vision up to a distance of 6 m.

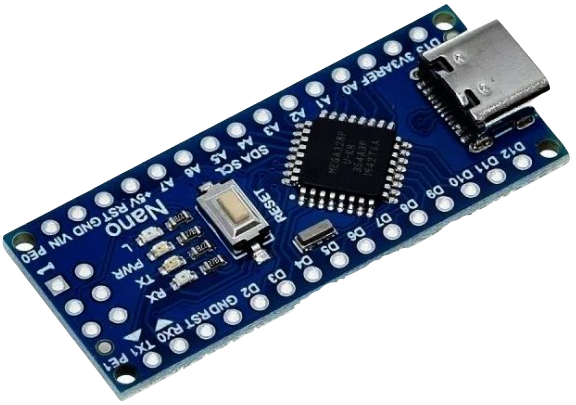




3.1 DESIGNING OF A MODEL

SYSTEM SPECIFICATION

- **Hardware requirements**



- Arduino nano.

The cross-platform Arduino integrated development environment (IDE), which is accessible on Windows, macOS, and Linux, was developed using Java. With the help of third-party cores, it is used to generate and upload programmes to boards that are compatible with Arduino as well as other vendor development boards.

Figure 1: Ultrasonic Sensor

- Ultrasonic Sensors

Description:
Ultrasonic sensors are mostly used for measuring distance. The waves are produced by ultrasound sensors, and the reflections are then collected. The ultrasonic sensor will now estimate the distance to the object. The range of its operation is 2-400 cm.
The ultrasonic sensor in "Smart Glasses" gauges the separation between the camera and an object in order to extract words from a text image. To get a clear image, the distance should be between 40 cm and 150 cm.
Distance L = 1/2 T C L: The distance Temporary pause between the emission and the receiving C: Sonic velocity *The value is raised by half since T is the time for the go-and-return distance.

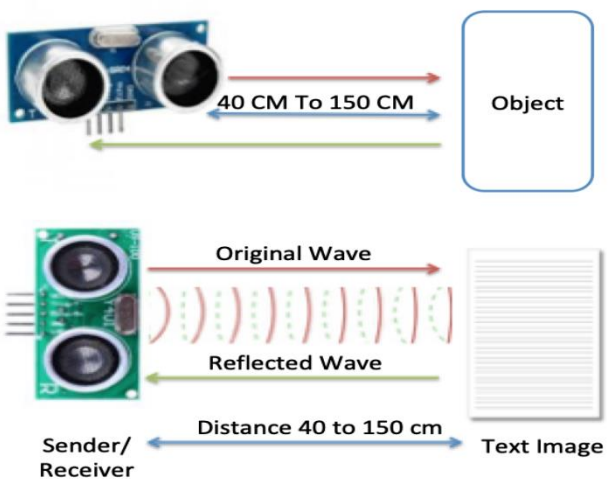
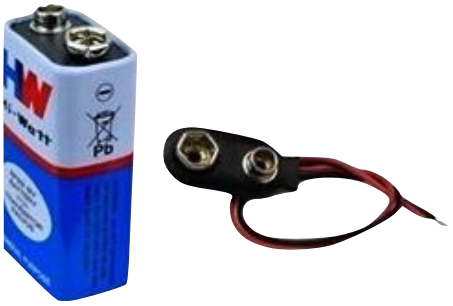


Figure 2: Measuring the destination of Ultrasonic Sensor

- Battery



It gives the power supply to the model

- Glasses

Glasses act as an embedded structure to bound all components of the

model

- Buzzer

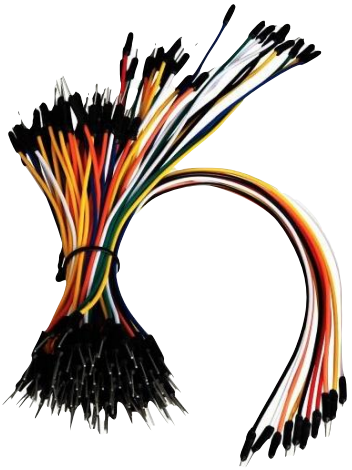
When the obstacles are detected it receives the signal from arduino and alerts the user with buzz sound

- Switches

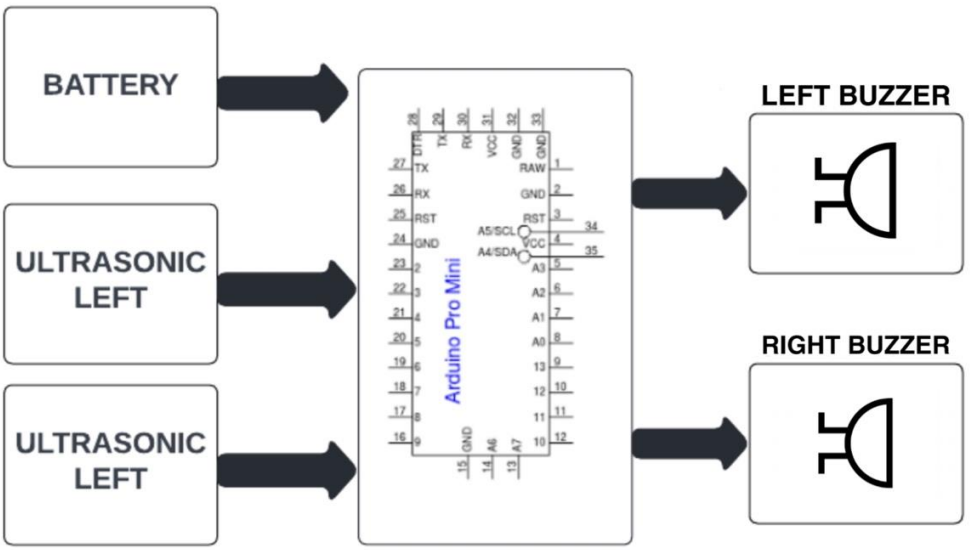
Switch used for switching on and off the power supply form the battery

- Cables and Connectors

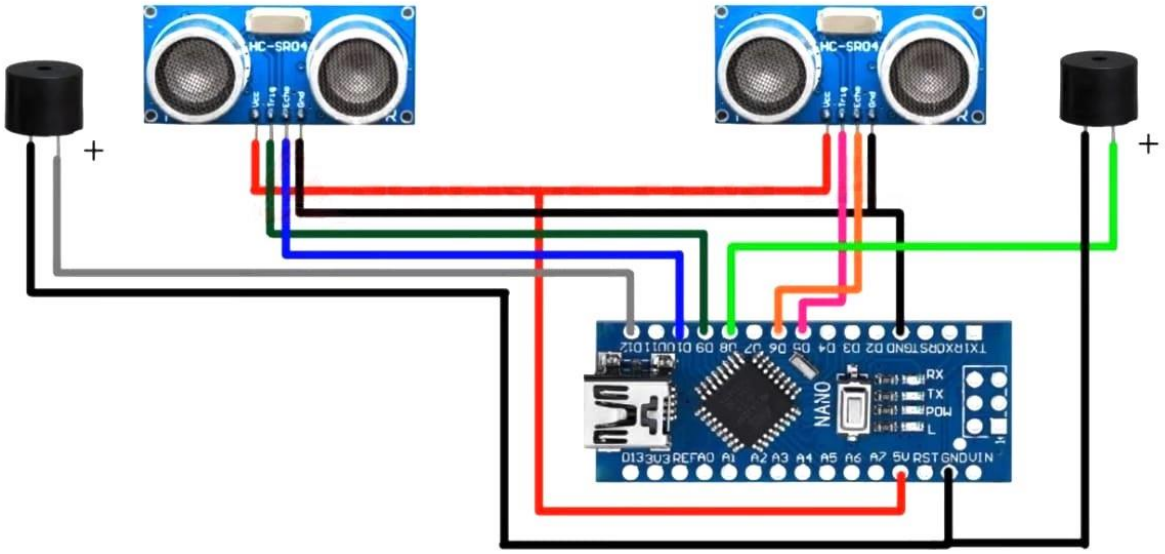
It helps to connects the components in the model



BlockDiagram

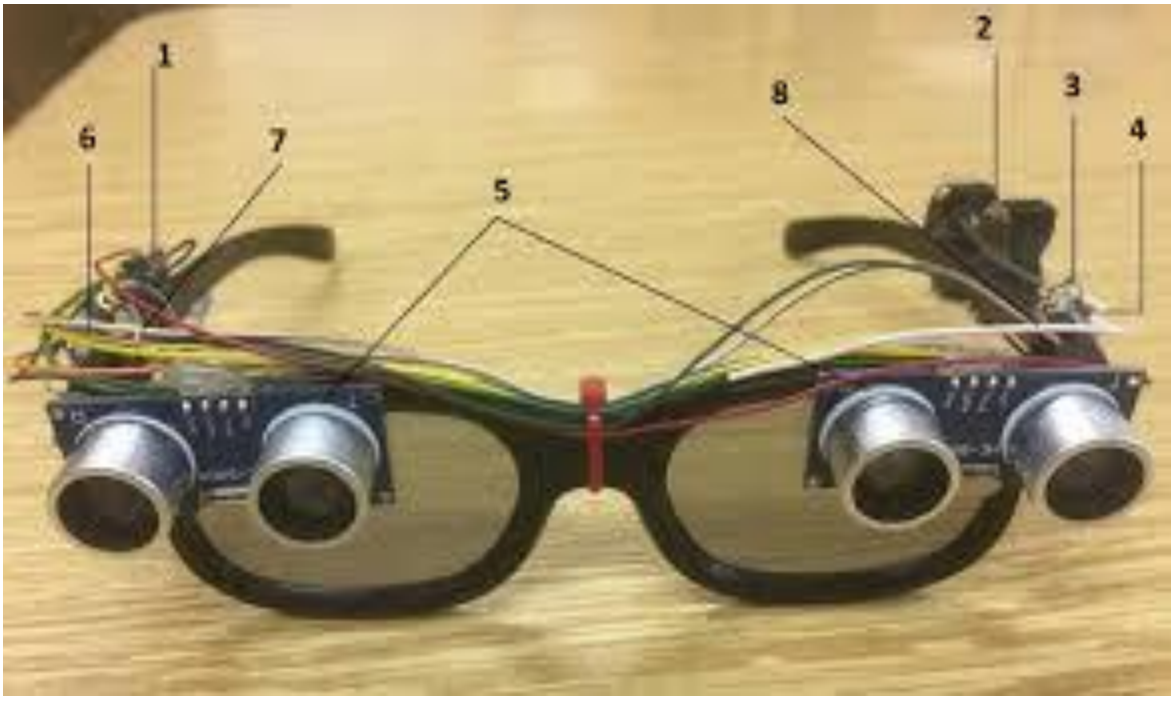


Circuit diagram



ideal model

Prototype model



Coding

```
#define trigPin1 5
#define echoPin1 6
#define buzzer1 8
#define trigPin2 9
#define echoPin2 10
#define buzzer2 12

long duration, distance, UltraSensor1, UltraSensor2;
char data;
String SerialData="";
void setup()
{
```

```
Serial.begin (9600);
pinMode(trigPin1, OUTPUT);
pinMode(echoPin1, INPUT);
pinMode(buzzer1, OUTPUT);
pinMode(trigPin2, OUTPUT);
pinMode(echoPin2, INPUT);
pinMode(buzzer2, OUTPUT);
digitalWrite(buzzer1,LOW);
digitalWrite(buzzer2,LOW);
}
void loop()
{
SonarSensor(trigPin1, echoPin1);
UltraSensor1 = distance;
SonarSensor(trigPin2,echoPin2);
UltraSensor2 = distance;
while(Serial.available())
{
delay(10);
data=Serial.read();
SerialData+=data;
}
SerialData="";
if(UltraSensor1 <=70)
{
digitalWrite(buzzer1,HIGH);
}
else
{
digitalWrite(buzzer1,LOW);
}
if(UltraSensor2 <=70)
```

```
{
digitalWrite(buzzer2,HIGH);
}
else
{
digitalWrite(buzzer2,LOW);
}
}
void SonarSensor(int trigPinSensor,int echoPinSensor)
{
digitalWrite(trigPinSensor, LOW);
delayMicroseconds(2);
digitalWrite(trigPinSensor, HIGH);
delayMicroseconds(10);
digitalWrite(trigPinSensor, LOW);
duration = pulseIn(echoPinSensor, HIGH);
distance= (duration/2) / 29.1;
}
```

EXPLANATION OF CODE

AnCertainly! Let's go through the provided code block by block and explain each part:

#define trigPin1 5

#define echoPin1 6

#define buzzer1 8

#define trigPin2 9

#define echoPin2 10

#define buzzer2 12

In this block, the code defines constants for pin numbers using the #define preprocessor directive. These constants are used to assign specific pin numbers to the trig and echo pins for two ultrasonic sensors (Sensor 1 and Sensor 2), as well as the pin numbers for two buzzers (Buzzer 1 and Buzzer 2).

long duration, distance, UltraSensor1, UltraSensor2;

char data;

String SerialData = "";

This block declares several variables:

duration, distance, UltraSensor1, and UltraSensor2 are of type long and will be used to store measurement values and distances obtained from the ultrasonic sensors.

data is of type char and is used to read incoming data from the serial port.

SerialData is of type String and is used to store data received from the serial port.

void setup()

```
{
  Serial.begin(9600);
  pinMode(trigPin1, OUTPUT);
  pinMode(echoPin1, INPUT);
  pinMode(buzzer1, OUTPUT);
  pinMode(trigPin2, OUTPUT);
  pinMode(echoPin2, INPUT);
  pinMode(buzzer2, OUTPUT);
  digitalWrite(buzzer1, LOW);
  digitalWrite(buzzer2, LOW);
}
```

The setup() function is called once when the Arduino board is powered on or reset.

It initializes the serial communication with a baud rate of 9600 using Serial.begin(9600).

It sets the pin modes for trigPin1, echoPin1, buzzer1, trigPin2, echoPin2, and buzzer2. The trig pins and buzzer pins are set as output pins, while the echo pins are set as input pins.

It sets the initial state of the buzzer pins to LOW using digitalWrite() to turn off the buzzers.

```
void loop()
{
  SonarSensor(trigPin1, echoPin1);
  UltraSensor1 = distance;
  SonarSensor(trigPin2, echoPin2);
  UltraSensor2 = distance;
```

```
while (Serial.available())
{
  delay(10);
  data = Serial.read();
  SerialData += data;
}

SerialData = "";

if (UltraSensor1 <= 70)
{
  digitalWrite(buzzer1, HIGH);
}
else
{
  digitalWrite(buzzer1, LOW);
}

if (UltraSensor2 <= 70)
{
  digitalWrite(buzzer2, HIGH);
}
else
{
```

```
    digitalWrite(buzzer2, LOW);
  }
}
```

The loop() function is called repeatedly after the setup() function. It performs the main functionality of the code. Here's a breakdown of the code inside the loop() function:

The SonarSensor() function is called twice to measure the distance using the ultrasonic sensors. The SonarSensor() function is a custom function that triggers the ultrasonic sensor and calculates the distance based on the echo duration.

The distance measurements obtained from Sensor 1 and Sensor 2 are stored in the variables UltraSensor1 and UltraSensor2, respectively.

The code then checks if there is any data available on the serial port using Serial.available(). If there

3.2 working

An ultrasonic sensor at a given distance uses soundwaves to detect the impediment in front of a person. A transceiver in this context is an ultrasonic sensor. Ultrasonic waves are emitted when the transmitter locates objects. The transmitter and receiver are located inside the ultrasonic sensor. The amount of delay between the broadcast and received signals is calculated.

The distance between the object and the sensor is ascertained using this technique. The brains of this invention were the Arduino Uno boards that we modified. Real-time object control and sensing are made easier with the help of the Arduino.

The Arduino Uno is programmed using the Arduino Software (IDE), our operational Integrated Development Environment that is used to programme all of our devices. If so, then the Arduino receives a signal.

4. RESULTS

The proposed system's performance has been found to be successful. With the aid of a buzzer, the ultrasonic sensors can identify impediments and warn the user with a beeping sound so that he can hear the noise and sense the obstructions. The suggested model is simple to wear and operate and may be carried around by those who are blind.

5.CONCLUSION

- ACCURACY LEVEL EXPECTED TO ACHIEVE WOULD BE 94% FOR OUR PROJECT
- These devices can be reached out to the needy with the help of the government and NGO′s.

- The goal of this project, Third Eye for the Blind, is to create a product that is incredibly helpful to people who are blind and frequently depend on others. With the use of wearable glasses that emit ultrasonic waves and alert users with buzz sounds or vibrations, it is an innovation that enables blind people to move about and go from one place to another with confidence and speed. By identifying impediments, it enables users who are blind or visually handicapped to move around freely. They merely need to wear this device on their body as a band or piece of clothing.

6.REFERENCES

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