

# Programming for Accessibility: Making the World Inclusive

## A Day at the Market



Saniya and Junaid were best friends who shared a love for technology and solving problems. They lived in a small but lively town where they often helped their neighbors fix phones, set up computers, or troubleshoot apps. One day, while shopping at the bustling local market, they noticed an elderly man struggling to find his way around.

The man, who was visually impaired, held a list in one hand and his walking cane in the other. Saniya watched as he hesitated near the entrance, unsure where to go. A kind shopkeeper eventually guided him, but the incident left Saniya thinking.

As they walked back home with their groceries, she said, "Junaid, did you see that? It must be so difficult for him to navigate the market. What if we could create something to help him?"

Junaid thought for a moment. "You mean like an app? Something that could guide him through voice instructions?"

Saniya's eyes lit up. "Exactly! Let's call it the **Smart Shopping Assistant**. It could help visually impaired people find items in stores or even navigate markets on their own."

## The Brainstorm

That evening, Saniya and Junaid sat down with a notebook and pen, brainstorming how the app would work.

“We’ll need the app to listen to the user’s voice,” Junaid said, sketching out the design. “Then it should check a database for the item’s location and give voice instructions.”

“Right,” Saniya added. “And we can use text-to-speech technology so it speaks back to the user. It should feel like they have a personal assistant in their pocket.”

They realized they could use Python, a programming language they were already familiar with, and libraries like `SpeechRecognition` and `pyttsx3` to bring their idea to life.

## Building the App

The next day, the duo started coding at Saniya’s dining table, which was now their makeshift lab. They decided to begin with a simple version of the app. It would have a small database of common items found in a grocery store.

Here’s what they came up with:

```
import pyttsx3
import speech_recognition as sr

# Store map
store_map = {
    "rice": "Aisle 1, near the entrance",
    "sugar": "Aisle 3, on the right",
    "milk": "Aisle 2, near the refrigerators",
    "bread": "Aisle 4, at the back",
}

# Convert text to speech
def speak(text):
    engine = pyttsx3.init()
    engine.say(text)
    engine.runAndWait()

# Recognize speech
def listen():
    recognizer = sr.Recognizer()
    with sr.Microphone() as source:
        print("Listening...")
        audio = recognizer.listen(source)
    try:
        command = recognizer.recognize_google(audio)
```

```

        return command.lower()
    except sr.UnknownValueError:
        return "Sorry, I didn't understand. Please try again."

# Shopping Assistant
def shopping_assistant():
    speak("Hello! What item are you looking for?")
    item = listen()
    if item in store_map:
        location = store_map[item]
        speak(f"{item} is located at {location}.")
    else:
        speak("Sorry, I couldn't find that item in the store.")

# Run the app
shopping_assistant()

```

When they tested it, the app worked like magic. Saniya spoke into the microphone, saying, “Where is the sugar?” The app replied in a clear voice: **“Sugar is in Aisle 3, on the right.”**

## Testing the App

Excited by their progress, Saniya and Junaid decided to share the app with their neighbor, Mrs. Khan, who had a visual impairment. She agreed to try it out.

“Sugar,” Mrs. Khan said into the phone.

“Sugar is in Aisle 3, on the right,” the app replied.

Mrs. Khan smiled. “This is wonderful! I can’t wait to use this next time I go shopping.”

Saniya and Junaid felt a wave of pride. Their small app was already making a difference.

## Taking It to the Next Level

Their teacher, Mr. Sharma, was so impressed by the app that he encouraged them to present it at a local science fair. “But don’t stop here,” he said. “Think about adding features like GPS navigation for markets or even multi-language support for people who speak different languages.”

Saniya and Junaid took his advice. They added a barcode scanner to the app, which could read product information aloud. They also started working on a feature that could help users find their way in bigger spaces like malls or train stations.

## The Real Impact

At the science fair, their app won first prize. But more importantly, it caught the attention of a local tech company, which offered to mentor them in improving it further. Soon, the app was being used by people all over their town.

## A Lesson for Everyone

Through this journey, Saniya and Junaid learned that programming isn't just about writing code—it's about solving real-world problems and making life better for others.

Their story proves that with curiosity, teamwork, and a desire to help, even the simplest ideas can create meaningful change.

## Your Mission

- Think about a challenge someone in your community faces. Could technology help solve it?
- Write a small program to test your idea, just as Saniya and Junaid did.
- Share your project with friends, family, or even your school. Who knows? You might just create the next big thing in accessibility!

With programming, you have the power to change lives—just like Saniya and Junaid did.