PIPER

Name: _____

Assessment
Security Zone

1) What process do dolphins use to orient themselves?
   a) Sonar
   b) Echolocation
   c) Radar
   d) GPS

2) What is the main purpose of an Ultrasonic Range Finder in this tutorial?
   a) To measure temperature
   b) To detect sound
   c) To measure distance
   d) To identify colors

3) Which pin on the Raspberry Pi Pico should the SIG pin of the Ultrasonic Range Finder be connected to?
   a) GP0
   b) GP15
   c) GP22
   d) GP28

4) What block should you use to repeat the sensor reading continuously in the program?
   a) If _ do block
   b) Print block
   c) Start block
   d) Repeat forever block

5) Which condition should you set to trigger an alarm if an object is detected within a certain range?
   a) Greater than 50 cm
   b) Less than or equal to 50 cm
   c) Equal to 50 cm
   d) Less than 50 cm

6) Describe a situation where using an Ultrasonic Range Finder might be helpful in a real-world application other than a security system. Explain how you would use it and why it would be beneficial.

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7) Imagine you are tasked with designing a self-driving car. How would you incorporate Ultrasonic Range Finders into your design to improve the vehicle's safety and functionality?

8) Look at the Python code below that you completed using Blockly. This code makes an alarm sound when an object comes within 50 cm of the Ultrasonic Range Finder. Can you think of a way to change the code to play a different sound if an object is closer than 20 cm and a different sound if the object is between 20 cm and 50 cm? Write the new Python code below.

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Answer Key
Security Zone

1) B - Echolocation

2) C - To measure distance

3) C - GP22

4) D - Repeat forever block

5) B - Less than or equal to 50 cm

6) *Example:* An Ultrasonic Range Finder can be helpful in a parking assistance system for cars. The sensor can detect how close the car is to obstacles when parking. This helps drivers park safely by alerting them if they are too close to an object, thereby preventing accidents and damage to the vehicle.

7) *Example:* In a self-driving car, Ultrasonic Range Finders can be placed around the car to continuously monitor the distance to nearby objects. They would provide real-time data to the car's control system, helping it navigate safely and avoid collisions. The sensors could also be used for parking assistance and detecting pedestrians or other vehicles nearby, enhancing the self-driving car's safety and functionality.

8) *Example:*

```
## ---- Imports ---- ##
import time
from piper_blockly import *
import board

## ---- Definitions ---- ##

GP22 = piperDistanceSensorPin(board.GP22, "GP22")

try:
  set_digital_view(True)
except:
  pass

def distance_range(_value):
  if (_value == None):
    return 520
  else:
    return _value
```

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```
## ---- Code ---- ##
while True:
  distance = distance_range(GP22.readDistanceSensor())
  piperGraphNumbers([str(distance)])

  if distance <= 20:
    playSound("drumkit-Clap1")
  elif distance <= 50:
    playSound("winloose-buzzer1")

  time.sleep(1)
```

Explanation:
This example code adds an extra condition to check if the distance is less than or equal to 20 cm and plays a different sound for that case. It plays the original alarm sound if the distance is between 20 cm and 50 cm.