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Assessment

Walker Dance

1) What is Walker's primary goal in the Mars Race for the Cause?
    a) To jump through hoops
    b) To climb a wall
    c) To perform a magic trick
    d) To race to the finish line

2) What is the tempo of the song "Stayin' Alive" mentioned in the tutorial?
    a) 80 beats per minute
    b) 100 beats per minute
    c) 103 beats per minute
    d) 120 beats per minute

3) What is the main benefit of using functions in Walker's dance code?
    a) To make the code look longer
    b) To avoid having to write the same steps multiple times
    c) To play music while Walker dances
    d) To change Walker's color

4) Which of the following steps is essential to ensure Walker starts its dance from the correct position?
    a) Setting the initial motor positions to 90°
    b) Programming the music to play first
    c) Mounting the Servos with the shortest distance between them
    d) Setting the wait time to match the song's tempo

5) How do you make Walker repeat the dance sequence until it is stopped?
    a) Add a wait block
    b) Add a loop over the entire sequence
    c) Call the functions multiple times
    d) Remove the setup function

6) Imagine you want to make Walker dance to a different song with a tempo of 120 beats per minute. How would you adjust the code to match this new tempo?

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7) How could you use the Servo motor angles and the looping function to create a unique dance move for Walker, such as spinning in place? Describe the steps and the code logic needed.

8) Look at the Python code below. This code makes Walker dance by stepping forward 5 times and then stepping backward 5 times. Can you change the code so that Walker dances in a new pattern? For example, make Walker step forward 3 times, step backward 3 times, and then fall over (like the nursery rhyme - “we all fall down”).

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Answer Key

Walker Dance

1) D - To race to the finish line

2) C - 103 beats per minute

3) B - To avoid having to write the same steps multiple times

4) A - Setting the initial motor positions to 90°

5) B - Add a loop over the entire sequence

6) *Example:* To adjust Walker's dance to a new song with a tempo of 120 beats per minute, I would change the wait times between each dance step to match the faster rhythm. This involves calculating the duration of each beat at 120 BPM and adjusting the delay in the code accordingly. 120 BPM is one beat every ½ second. So the total time for a movement should be exactly 0.5 seconds.

7) *Example:* To make Walker spin in place, I would program the Servo motors to move the legs in a pattern that causes rotation. If you change the range of the front or back leg, it will cause the Walker to veer in one direction or the other. If the Walker veers a bit forward, and then veers a bit more backward, and this repeats in a loop, the Walker will slowly spin in place.

8) *Example:*

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

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

GP1 = piperServoPin(board.GP1, "GP1")

try:
  set_digital_view(True)
except:
  pass

GP0 = piperServoPin(board.GP0, "GP0")
# Describe this function...
def step_forward():
  GP1.setServoAngle(60)
  time.sleep(0.2)
```

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```
  GP0.setServoAngle(120)
  time.sleep(0.2)
  GP1.setServoAngle(120)
  time.sleep(0.2)
  GP0.setServoAngle(60)
  time.sleep(0.2)

# Describe this function...
def step_backward():
  GP0.setServoAngle(60)
  time.sleep(0.2)
  GP1.setServoAngle(120)
  time.sleep(0.2)
  GP0.setServoAngle(120)
  time.sleep(0.2)
  GP1.setServoAngle(60)
  time.sleep(0.2)

# Describe this function...
def fall_down():
  GP0.setServoAngle(0)
  GP1.setServoAngle(180)
  time.sleep(0.2)
  GP0.setServoAngle(180)
  GP1.setServoAngle(0)
  time.sleep(0.2)

# Describe this function...
def set_up_motors():
  GP0.setServoAngle(90)
  GP1.setServoAngle(90)


## ---- Code ---- ##
set_up_motors()
for count in range(3):
  step_forward()
for count2 in range(3):
  step_backward()
fall_down()

  time.sleep(0.3)
```