Activity 5: Sensors and IoT (Part 2)

Activity 5: Sensors and IoT

Group No : 35
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Part 2: Utilizing Sensors

In this part, design how your device sensors can be used to determine the results specified in that task. Make any assumptions that you feel are appropriate.
For each task below, **please follow the following steps**:
- Press the **"Start"** button. Perform the task with your group and **take some photos**.
- Press the **"Stop"** button. **Capture a picture of the plot** and press the **"Export"** button to **export the data** that you think is involved in that task.
- Explain how to determine the result directly from the plots.
- Write **the python code** to compute the result using the data exported from the sensor. You can use this link (https://colab.research.google.com/drive/1B0GtSBEl9XHJogIay4DZGPEnpJyXkwHa?usp=sharing) as the **starter code**.
- **Compare the result** computed from python with the result that you determined directly from the plot. **The results from both analyses should be approximately the same (Don't need to be equal.).**

1. **Determine how many steps that a person needs to walk from the 4th floor to the 5th floor of ENG100 building.**
- **Starting point:** In front of the first stair step at the 4th floor of ENG100 building
- **Finishing point:** After the last stair step of the 5th floor of ENG100 building
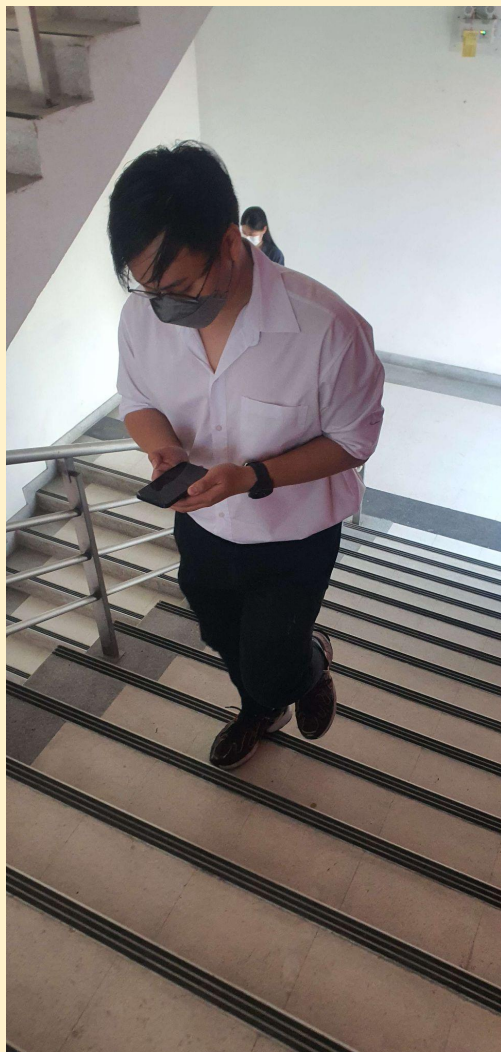
Note:
- It's ok that your python code can compute the number of steps only for this building.
- It's ok that your python code can compute the number of steps only for these plots (not in general).

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- You should handle your device like the figure below to make it easier to determine the plot and data.
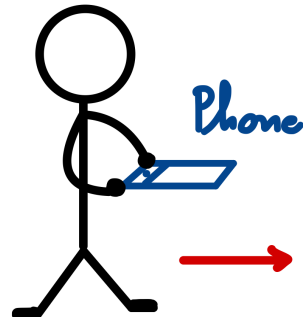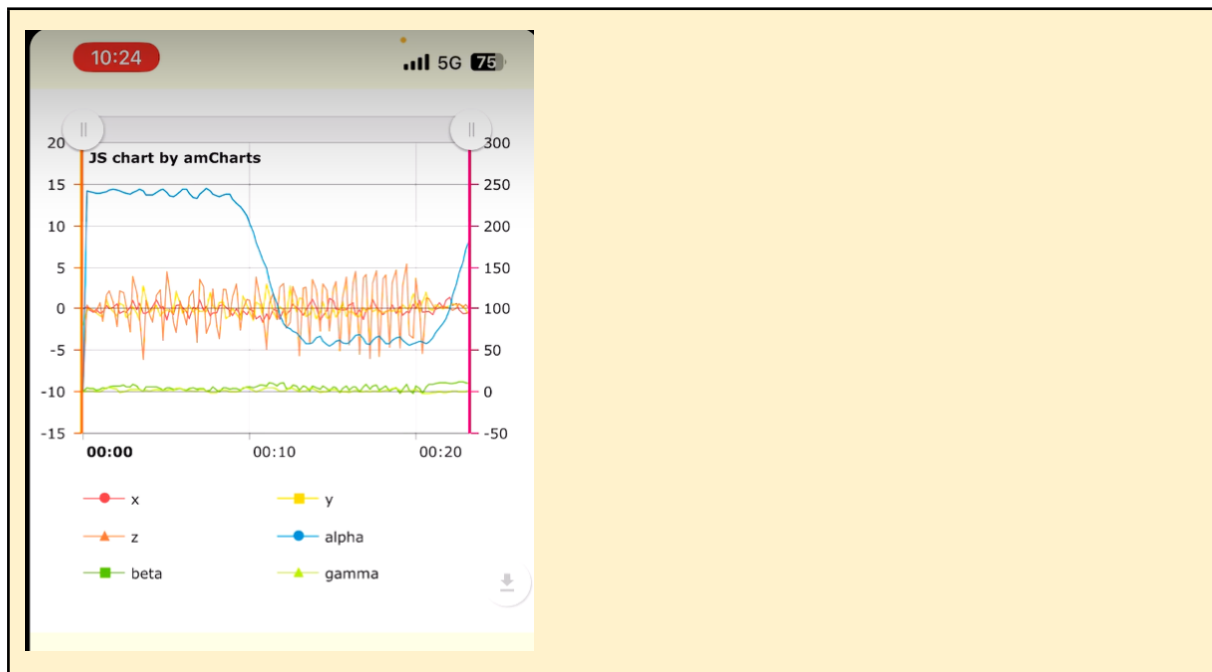

  1.1.   Some **photos of your group** performing the task.

  1.2.   **A picture of the plot.**

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1.3.   Explain how you **determine the result directly from plots** of the output from related sensors.

Consider the number of steps from the value from the z axis and count the number of peaks from the list of values.

1.4.   **The python code** used to compute the result from the exported data **with the output result**.

```python
def count_number_of_steps(data):
  number_of_steps = 0
  isUp = False
  for value in data:
    if not isUp and value > 0:
      number_of_steps += 1
    isUp = value > 0

  ## TODO:  Create an algorithm to count the number of steps
  ##        using numeric data from the sensor.


  return number_of_steps
print(f'Step count : {count_number_of_steps(data)}')
```

1.5.   Briefly explain about the counting logic in python code.
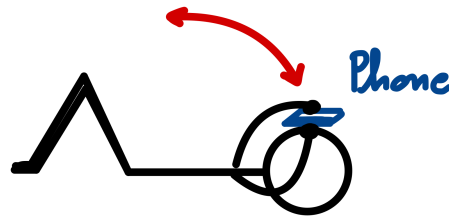
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> Loop through the values and consider whether the current value is negative or not
> If the previous value is negative and the current value is positive, increase the
> number of counts by one.

Once you finish, students must call an instructor or a TA for inspection.

2. **Let one person in the group do 10 sit-ups. Determine how to count the number of times that person doing sit-ups using output from related sensors.**

Note:

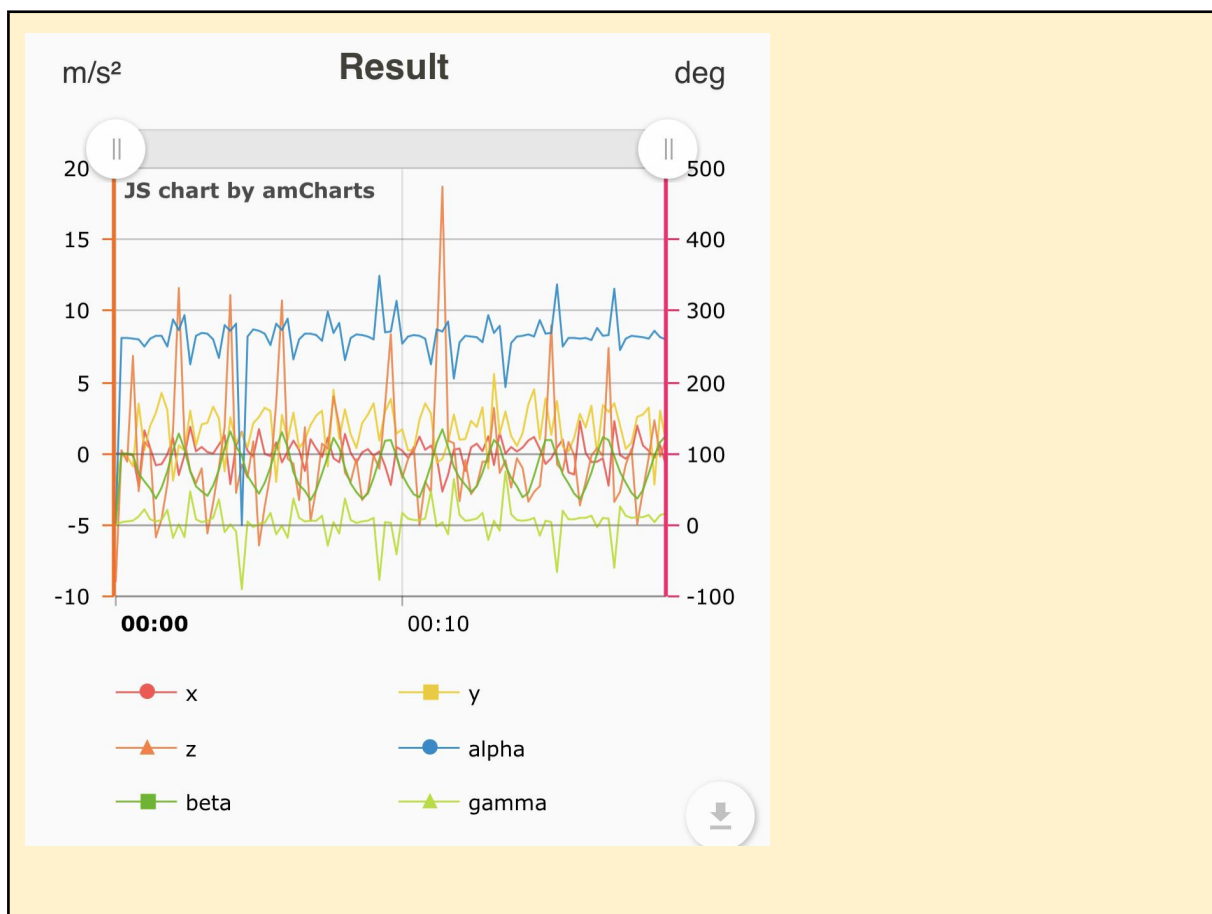- You should handle your device like the figure below to make it easier to determine the plot and data.

    2.1.   Some **photos of your group** performing the task.

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2.2.   **A picture of the plot.**

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2.3.   Explain how you **determine the result directly from plots** of the output from related sensors.

Consider the number of sit-ups from the value of Beta and count the number of peaks from the list of values.

2.4.   **The python code** used to compute the result from the exported data with the output result.

```python
def count_number_of_situp(data):
  number_of_situp = 0
  ## TODO:  Create an algorithm to count the number of times that
  ##        person doing sit-ups using numeric data from the sensor.
  isUp = False
  for value in data:
    if not isUp and value < 60:
      number_of_situp += 1
    isUp = (value < 60)

  return number_of_situp
print(f'Situp count : {count_number_of_situp(data[4:])}')
```

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2.5.   Briefly explain about the counting logic in python code.

Loop through the values and consider whether the current value is less than 60 or not

If the previous value is more than 60 and the current value is less than 60, increase the number of counts by one.

Once you finish, students must call an instructor or a TA for inspection.

— THIS IS THE END OF PART 2 —