| **CodeAIR Mission 6 Assignment** | **Name:**  |
|---|---|
| **Pre-Mission Preparation** | |
| What are RANGERS, and what are they used for? | |
| ***Avoidance***, the last program in Mission 5, could throw an exception. What was your 'bugfix'? | |
| **Mission 6 Checks – Navigate!** | |
| Objective #1<br>What is the flow sensor? | |
| What can the flow sensor detect? | |
| What are "deltas"? | |
| What is the code for reading the flow sensor? | |
| Give an example of a format string: | |
| Objective #2<br>How does altitude affect flow values? | |
| How does the flight controller account for altitude? | |
| Objective #3<br>What does the flow sensor "see" during rotation? | |
| Objective #4<br>What is the code for reading the battery voltage? | |
| When can you assess the battery level? | |
| What is the best way to know the true battery level? | |
| Objective #5<br>What is a byte? | |
| What is the code for using binary to turn on LEDs? | |

The 8 blue LEDs can display an integer value between 0 and 255. Practice your binary skills by converting the binary to decimal and decimal to binary:

| Binary number | Decimal number |
|---|---|
| 00000010 | |
| 00000100 | |
| 00000110 | |
| 00010001 | |
| 00100000 | |

| Decimal number | Binary number |
|---|---|
| 3 | |
| 10 | |
| 15 | |
| 33 | |
| 64 | |

| | |
|---|---|
| Objective #6<br>What are exceptions in programming? | |
| What exception happens when you run the code for this Objective? | |
| Objective #7<br>Does CodeAIR use an external positioning system? Why or why not? | |
| What code is used to handle exceptions? | |
| Why do the pixel LEDs turn pink? | |

**Log the Data:** Make notes with each test flight. You can use the chart on the next page, use the spreadsheet, or come up with your own note-taking system. You can add more routes. You can also change the velocity. Use the data to answer the reflection questions.

**Post-Mission Reflection:** During the Objective you were presented with three questions:

- How accurately can you move a particular distance using flow sensor data?
- Is flow-sensor accuracy dependent on altitude?
- Would a slower velocity help or hurt?

Reflect on the data and write a response:

# Mission 6 Navigate – Flight Data

Name:

Make notes with each test flight. ***Run each route multiple times.*** Add more routes to expand the data set.

- How much does the distance vary between runs?
- What is the average distance?

| Route | Velocity | Height | Route distance | Measured distance | Describe conditions |
|---|---|---|---|---|---|
| 1 | 0.2m | 0.3m | 1.0m | | |
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