**Helmet Code Flowchart**

1. **Setup**
   * Initialize Serial, HC12, GPS, and SIM modules.
   * Set pin modes for sensors and LEDs.
   * Initialize alcohol readings array.
2. **Main Loop**
   * **Button Pressed Check**
     + If button is pressed:
       - If system is locked, unlock it, send "unlock" message, and stop ping countdown.
       - If system is not locked and helmet is on, reset notified drunk status, and send "reset" message.
       - If system is not locked and helmet is off, lock system, send "lock" message, start ping countdown, and turn on LED.
   * **Locked State Handling**
     + If locked, listen for HC12 messages.
       - If "ping" message received, restart ping countdown.
       - If ping countdown expires, listen to GPS for helmet theft coordinates and send alert if valid location found.
     + Blink LED.
   * **Unlocked State Handling**
     + If helmet is on:
       - If rider is drunk, send "riderDrunk" message and notify emergency contact.
       - If rider is not drunk, send "riderReady" message.
     + If helmet is off, send "riderNotReady" message.
3. **Helper Functions**
   * isButtonPressed(): Check if button is pressed.
   * isHelmetOn(): Check if helmet is worn by reading force sensor values.
   * isDrunk(): Check if rider is drunk by reading and averaging alcohol sensor values.
   * sendHC12(): Send message via HC12.
   * sendGSMMessage(): Send SMS message via SIM module.
   * trimWhitespace(): Trim whitespace from a string.
   * blinkLed(): Blink LED.

**Vehicle Code Flowchart**

1. **Setup**
   * Initialize Serial, HC12, GPS, SIM, MPU6050 modules.
   * Set initial states for relay and crash/lock notifications.
2. **Main Loop**
   * **Read HC12 Messages**
     + If message received:
       - If "riderReady", turn on relay, stop countdowns, and reset crash notification.
       - If "reset", reset crash notification.
       - If "lock", listen to GPS for lock coordinates, turn off relay, start location check countdown, and set lock state.
       - If "unlock", stop location check countdown and unset lock state.
       - Otherwise, start engine shutoff countdown.
   * **Locked State Handling**
     + If locked, check location periodically.
       - If distance from locked location exceeds threshold, send vehicle theft alert.
   * **Unlocked State Handling**
     + Monitor rider's x-orientation.
       - If an accident is detected, start crash countdown and beep.
       - If crash countdown expires, notify emergency contact with GPS coordinates and turn off relay.
     + Handle engine shutoff countdown by beeping and turning off relay if countdown expires.
3. **Helper Functions**
   * isAccident(): Determine if an accident has occurred based on x-orientation.
   * trimWhitespace(): Trim whitespace from a string.
   * beep(): Emit beep sound.
   * getXOrientation(): Get x-orientation from MPU6050.
   * sendHC12(): Send message via HC12.
   * sendGSMMessage(): Send SMS message via SIM module.

**Flowchart Diagram**

plaintext

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| Helmet Code |

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| Setup |

| Initialize modules and pins |

| Setup initial states |

+-------------------------------------+

| Loop |

| Is button pressed? |

| Yes -> Handle button press |

| No -> Continue |

| |

| Is system locked? |

| Yes -> Handle locked state |

| No -> Handle unlocked state |

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| Vehicle Code |

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| Setup |

| Initialize modules and pins |

| Setup initial states |

+-------------------------------------+

| Loop |

| Read HC12 message |

| Handle message actions |

| |

| Is system locked? |

| Yes -> Handle locked state |

| No -> Handle unlocked state |

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