Project Title: William and Mary Health & Wellness Wheel
Product Name: 8 dimensions wellness guidance tool
Team Name: Clarity

Primary User Group: William & Mary students who want to improve their wellness proficiency.

Team Roster & Roles/Hats:

1. James - Team Lead, Electronics and Creative Design Advisor
    a. Organizes meetings and assigns tasks, oversees progress of other members
    b. Reviews and submits weekly progress reports
    c. Designs software aspect of UX: What the user sees in the terminal as the program runs
2. Aidan - Software developer, Software to electronics advisor
    a. Organizes and fills github repo - chief software engineer
    b. Oversees electronics in relation to software development
    c. Designs BTS software aspect of UX
3. Charlotte - Creative designer, Physical UX designer
    a. Chief coaxial contrarotation mechanism designer
    b. Creative designer for physical aspect of UX (wellness wheel and wellness wand)

Concept Overview: We will be building a wellness wheel. It will take an input from the wellness wand and play music while rotating, landing on a specific dimension of wellness (as defined by the W&M department of health and wellness) and output audio instructions for how the user can improve that area of wellness in their life, both long and a small action to be completed immediately.

Input Modality & Features: We will have a wellness wand that contains an accelerometer. Upon a button press, it will start recording motion data. The wand will be labeled with the dimensions of wellness, allowing the user some discretion in which one they get advice on, but the goal is to subconsciously examine the user's movement tendencies to diagnose what area they actually need advice on.

Input, motion mapping (for both rotors): IMU records a list of acceleration values in the x, y, and z direction, as well as angular velocity, ω. Then code parses through the values and then pseudo randomly picks a value in the list based on the last element in that list. Whichever one it lands on then will give a certain output based on whether the measurement was positive or negative and in the x, y, z, or ω direction, giving us 8 possible outputs. Rounding the resulting number to an integer, and whether it's even or odd will also determine rotation direction. The magnitude of the number will determine the rotation speed. Rounding the number to the nearest multiple of 10 will determine the number of rotations before landing on the corresponding dimension of wellness. (scale TBD).

UI/UX & affirmation plan:

Dimension	*Description of Dimension (first part of output):*	*Long term interactive actions (second part of output)*	*Short term interactive action (third part of output)*	*Direct Input (user motion that correlates to dimension)*
Emotional	The emotional dimension of wellness includes you coping effectively, having a sense of positive self-regard, and maintaining satisfying relationships. In order to sustain your emotional dimension of wellness, keep a positive attitude, be sensitive to your feelings and the feelings of others, learn ways to cope with your own stress, and be realistic about your expectations and time.	Practice gratitude to start recognizing the positive aspects of your life. Prioritize self care by taking time for yourself to engage in activities that promote your well-being and self care. Set a stable routine to help regulate your emotions. Engage is regular physical activity to improve your mood. & Practice mindfulness to help you stay present and remove stress.	Make a short list of things that help you best cope with stress. Then, make a short list of things you are grateful for.	Y axis negative linear motion (bringing the wand to your heart)
Physical	Physical wellness encompasses your physical wellbeing. Recognizing the need for physical activity, healthy foods, and sleep is imperative towards maintaining your	Get regular physical activity. Maintain a balanced diet. Prioritize restorative sleep. & Stay hydrated.	Do 10 jumping jacks.	Y-axis positive linear motion (like punching something)

	overall physical wellness.			
Social	Social wellness is defined as the ability to form and maintain positive relationships, create a support system, and foster a sense of belonging and connection with others. This dimension encompasses how we interact with family, friends, coworkers, and the community.	Make time for family and friends in your schedule. Prioritize your relationships. Stay in contact. Engage in community activities. & Join clubs and organizations.	Text a friend right now and ask them how they're doing.	Rotational motion (positive or negative or both) in y-axis (like waving hello!)
Financial	The financial dimension encompasses your financial wellbeing. This includes maintaining satisfaction with current and future financial situations and learning how to manage stress regarding monetary subjects.	Create and maintain a budget. Research your investment options. Practice conscious spending. & Create a savings account.	Make a budget for this week. Set an amount you'd like to spend, a list of what you need to buy, and a list of what you want to buy.	Linear Motion in Negative Z direction (towards the ground, like dropping money in a piggy bank)
Occupational	Occupational wellness entails your personal satisfaction and enrichment from your career. This involves aligning your career with personal values, interests, and	Find a meaningful role. Learn to find a healthy work-life balance. Thoughtfully explore your career options.	Make a list of your primary values. Then, try to think of a few careers that might align with these values.	Rotational motion on z axis (the daily grind)

	skills, leading to a sense of purpose and fulfillment through work.	Determine your career goals and how to achieve them. Set boundaries for time spent working. & Make meaningful connections with your coworkers.		
Environmental	Environmental wellness is the practice of creating a harmonious relationship with the environment that you spend time in, enhancing personal well-being. Environmental wellness can help encourage physical and mental health and increase efficiency.	Spend time in nature. Spend time making your space yours. Practice cleanly habits. Maintain organization within your personal space. & Practice sustainable habits.	Go spend five minutes being present in nature. What do you see? What do you hear?	X direction linear motion (like a landscape)
Intellectual	Intellectual wellness involves engaging in activities that stimulate mental growth, promote critical thinking, and encourage lifelong learning. This includes prioritizing	Read Find intellectual topics that interest you. Stay curious Limit your time on social media. Listen to others'	Find a nonfiction book that you want to read.	Rotation Towards User (negative rotation about X axis, like pointing towards the head)

	intellectual advancement, recognizing ways to expand knowledge and skills through intellectually stimulating activities, and valuing new knowledge about the world around you.	perspectives.		
Spiritual	The spiritual dimension encourages exploration of our sense of purpose and meaning in life. It is the state of being connected to something greater than oneself, or encompassing a set of values, principles, and beliefs that provide a sense of meaning in life. It nurtures inner peace, self-awareness, and a profound connection to the universe.	Practice Self Reflection Meditate Write down your thoughts or journal frequently. Dedicate time to practice your spirituality. Engage in gratitude. Practice mindfulness and be present. Explore different religious practices.	Practice mindful breathing for one minute.	Linear motion in positive Z direction (towards Sky)

Evidence plan:
The code will record the data from each axis and direction in arrays and then combine them into a single ordered csv. The code will then take the average of the last data points from each DOF and use them to produce a single number which will be printed to the terminal. The magnitude of this number will determine the rotation speed, the evenness will determine direction, and dividing by 10 and rounding to the nearest integer will determine the number of rotations. The resulting direction, speed, and count will all be printed to the terminal, along with a message to

signify the start of rotation. The dimension of wellness will also be displayed along with a message when rotation has finished and the audio has started.

Example data/CSV:
x_data = [1.23, 4.56, -7.89, 2.34, 5.67, -5.73, 2.51, 9.832]
y_data = [3.45, -6.78, 9.01, -2.34, 7.89, -1.23, 4.56, -8.91]
z_data = [2.34, -5.67, 8.90, -1.23, 6.78, -3.45, 7.89, -4.56]
x_rot_data = [0.12, -0.34, 0.56, -0.78, 0.90, -0.11, 0.22, -0.33]
y_rot_data = [-0.45, 0.67, -0.89, 0.12, -0.34, 0.56, -0.78, 0.90]
z_rot_data = [0.23, -0.45, 0.67, -0.89, 0.12, -0.34, 0.56, -0.78]

```
data = []
for x, y, z, xr, yr, zr in zip(x_data, y_data, z_data, x_rot_data, y_rot_data, z_rot_data):
        data.extend([("x_data", x), ("y_data", y), ("z_data", z), ("x_rot_data", xr), ("y_rot_data",
yr), ("z_rot_data", zr),])
```

Output: (‘x_data’, -5.73)

Motion/Control & Safety:
We will have a two step testing and safety plan for each step of our design project. For the inputs, we will ensure that they are properly insulated and user inputs are controlled by carefully outlined procedural steps. For the wheel, we will test the speed of the wheel and ensure it remains below a particular rpm such that it will not fall off. We will ensure it is properly secured. After each week, we will spend the last twenty minutes of class testing the completed parts to ensure that they work properly and will not result in any harm to the user.

BOM v0.1:

- 2 NEMA17 Stepper motors
- 2 DRV8833 Motor drivers
- Raspberry Pi 5 (ofc)
- Speakers for audio output (not sure what kind yet, but any that interface with the Pi are probably fine)
- Cardboard and pvc for construction (we still need to figure out amounts/dimensions)
- Hot glue gun/hot glue
- What stuff do we need for breadboards when we don't have one ?
- IMU & Button for input stage
- Aesthetics
    - Set of acrylic paint/brushes
    - Cotton balls
    - Popsicle sticks

Repos & Channel:
Github Repo: https://github.com/charlottebandekow/SI-Final-Project---WM-Wellness.git
Youtube Channel: YouTube

Inspiration: https://www.wm.edu/offices/wellness/about/eight-dimensions/

Project timeline with owners:

Week	Tasks	Owner
11/3/25	Finalize and Submit Proposal and BOM	James
11/5/25	Create inputs	Aidan
11/12/25	Wheel	Charlotte
11/12/25	Design Co-axial contrarotation system	Charlotte
11/12/25	Wellness Wand	James
11/19/25	Construction of input setup	Aidan
11/26/25	**Thanksgiving!**	
11/3/25	Last minute aesthetics/testing	Charlotte will assemble driveshaft, wheel, and wand, James will assemble electronics, Aidan will troubleshoot code

Top risks & Mitigation:

1. Input failure: It may prove difficult to classify specific movements and narrow them down to only 8 direct outputs. We may have to simplify or further randomize the way the input maps to each dimension of wellness.
2. Motor Design: It also may be difficult to have coaxial-contrarotating rotors. We will research different pre-existing mechanisms and if we struggle to get them to work we may resort to only using one motor with gear mechanisms to reverse the rotation direction.