



## Background

**Cognitive overload** or task saturation occurs when individuals are required to process multiple stimuli simultaneously. In the operating room, this leads to a reduction in inter team communication and increased risk of complications.



QR code linked to game server

- Communication failures contribute to ~43% of medical malpractice cases
- Surgical teams experience communication breakdowns as frequently as every 8 minutes



Figure 1. Example OR showcasing multiple stimuli surgical teams face.



Figure 2. Task saturation applies to other occupations such as pilots or air traffic controllers.

## Objectives

- Develop a multi-player training program that simulates cognitive overload
- Promote early recognition of cognitive fatigue symptoms
- Promote inter-team communication
- Create a cross-platform, low-cost solution accessible to diverse training environments

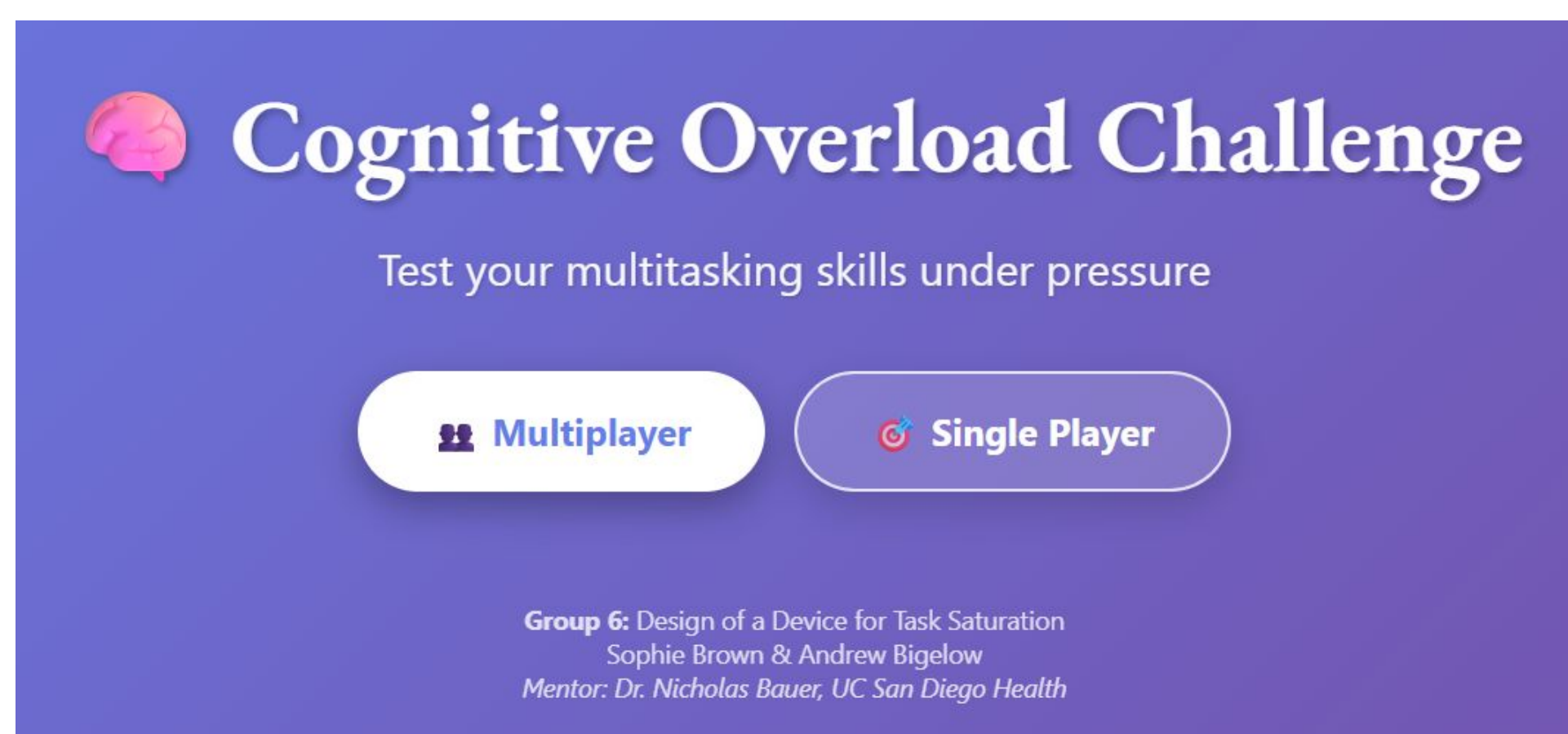


Figure 3. Starting screen of web application.

## Program Design

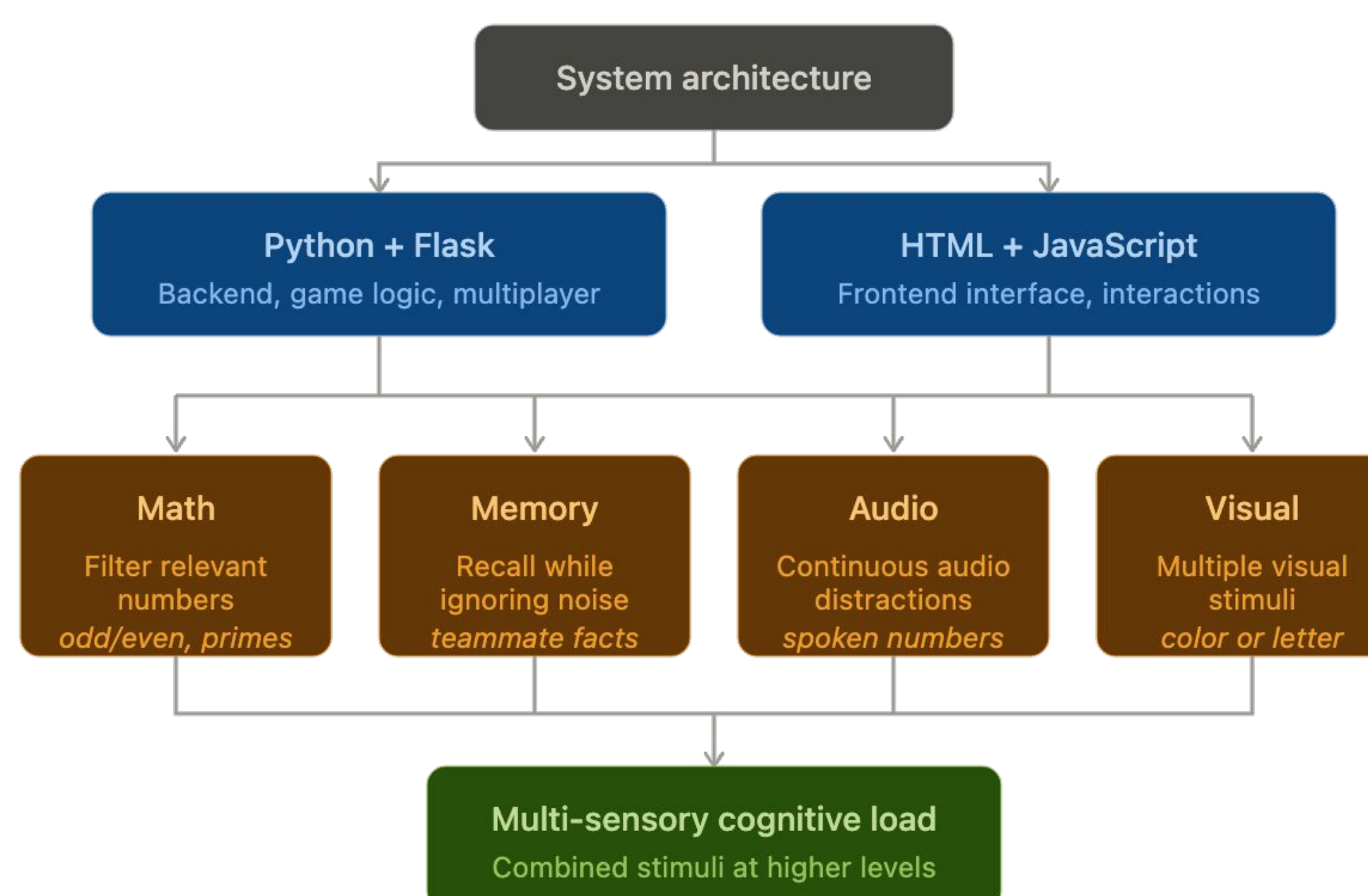


Figure 4. High level system architecture. How the overall program is broken down by language and sensory module.

## Design Outcome



Figure 5. Visual tasks including clicking on images with a certain color or letter.

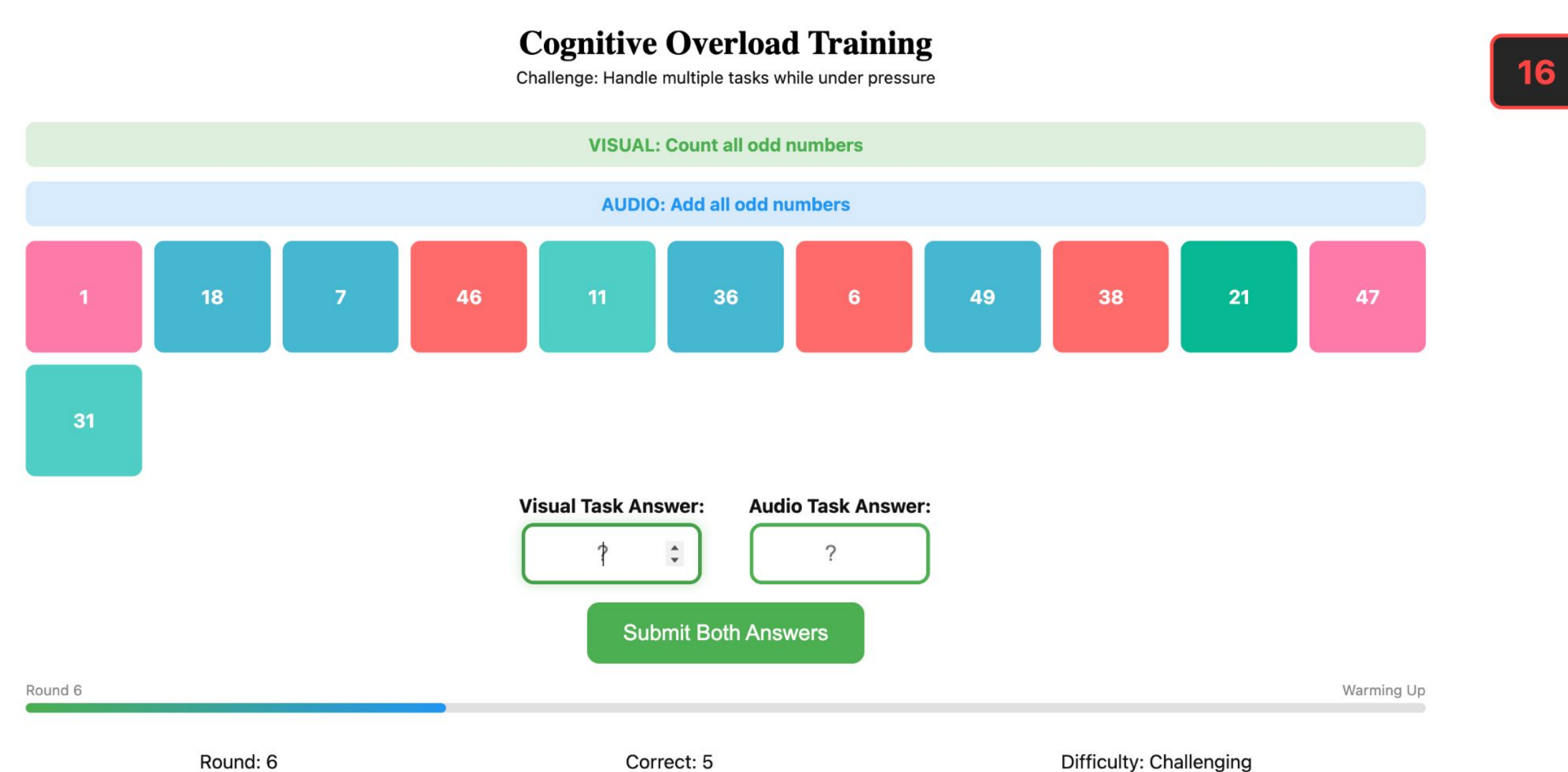


Figure 6. Math tasks including variations of arithmetic with numbers on screen or numbers fed in through audio.

## Testing

Our testing plan evaluated: **cross-platform compatibility, difficulty scaling, and technical difficulties.** Each player attempted single-player mode until failure and completed our feedback survey.

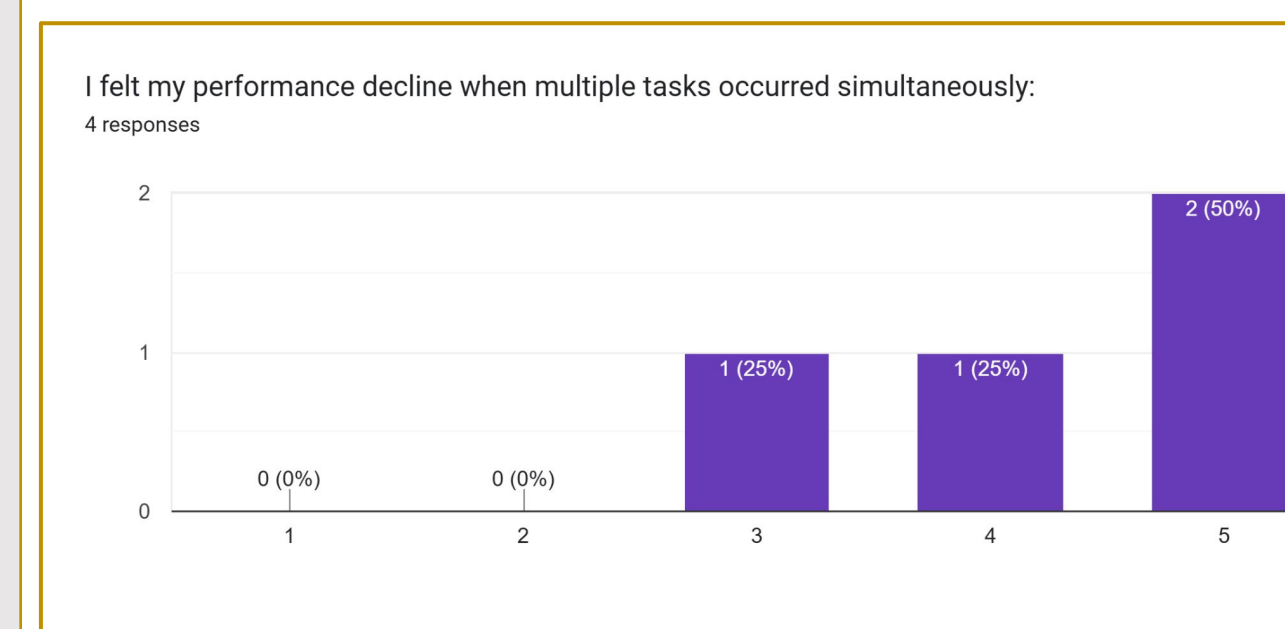


Figure 7. Performance Decline Perspective.

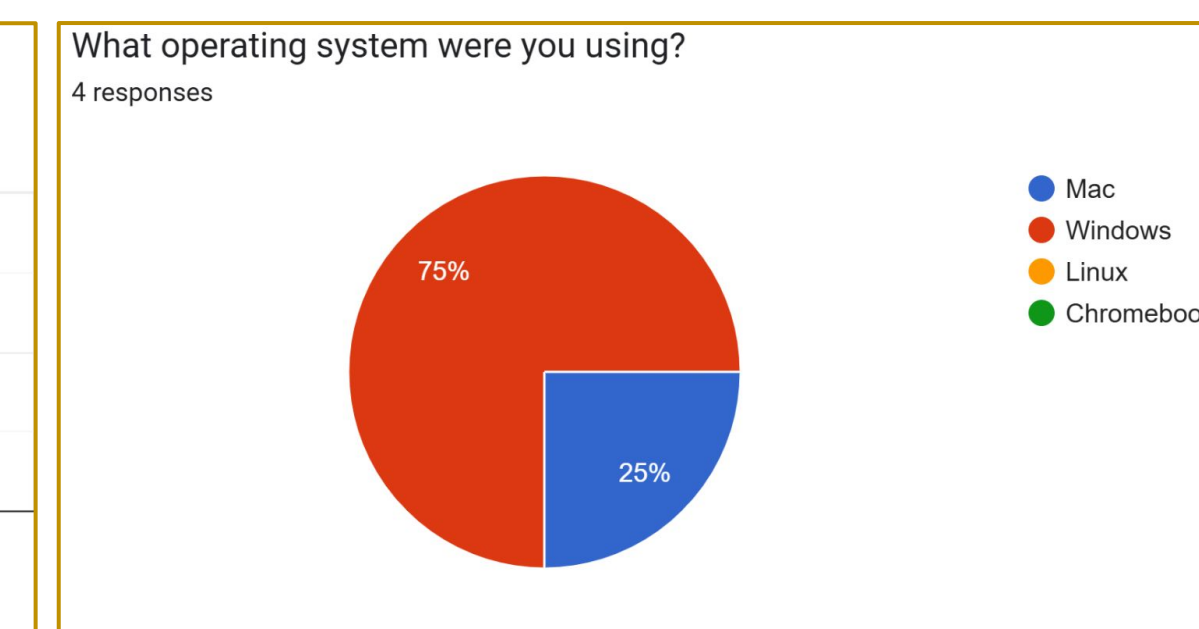


Figure 8. Operating System Usability.

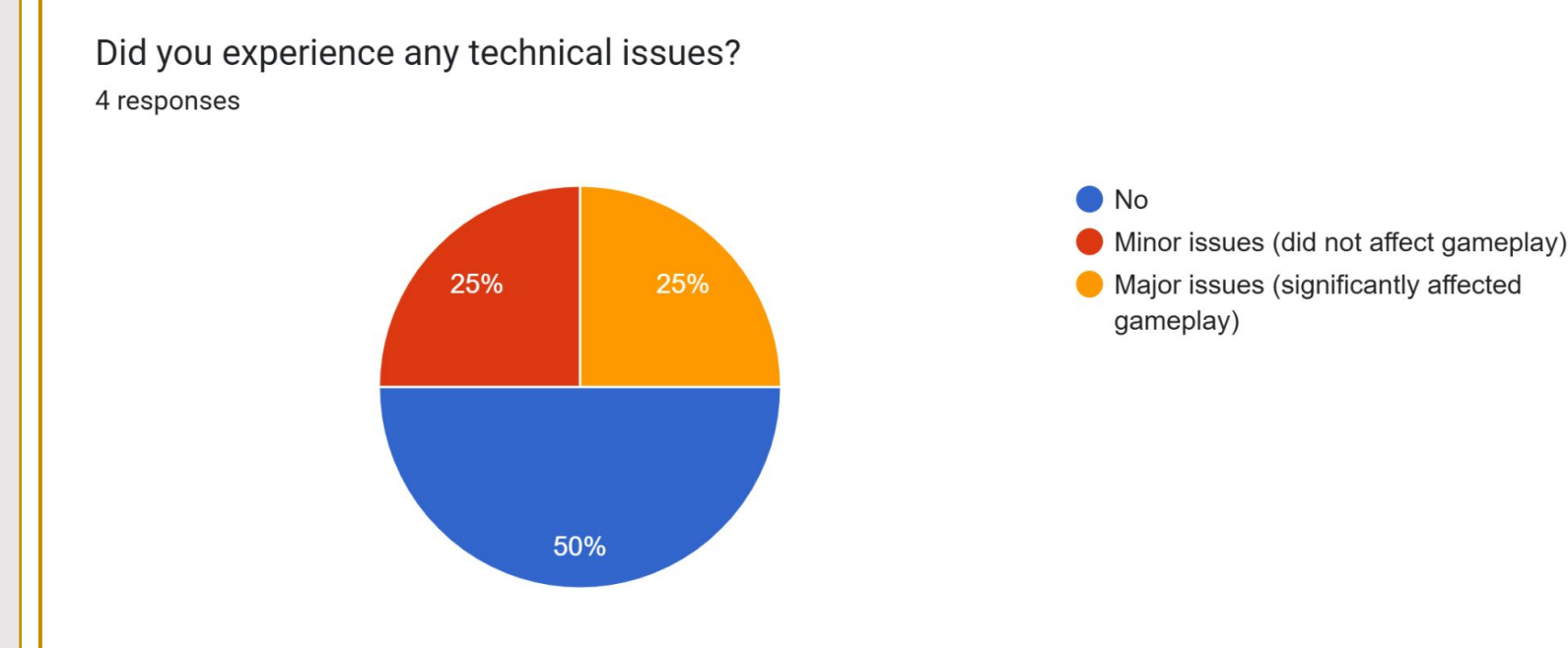


Figure 9. Reported Technical Issues.

- Future testing with:
  - UCSD Medical Interest Groups
  - UCSD Anesthesia Residents

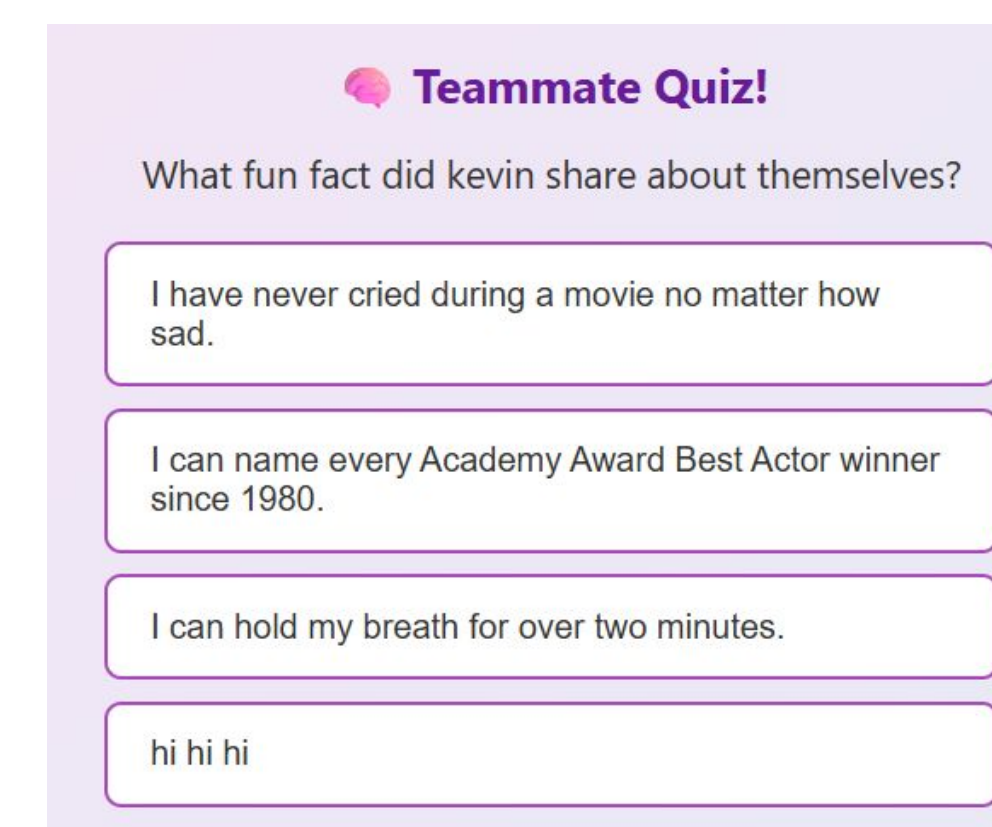
- No testers reported system-specific issues
- Players consistently reported feeling overwhelmed by levels 4 to 5 out of 20

## Conclusions

Our application offers a fun and competitive training, designed to **boost communication** in times of stress and **increase teamwork** among cross-functional teams.

### Limitations:

- No testing with target population
- Speech-to-text sensitivity
- Task Variety



## Acknowledgements & References

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