Given that fully training our model requires weeks of computational time, and our primary focus is on evaluating various group testing algorithms we've developed, we've opted to create a simulator to mimic the behavior of a trained model. We've engineered this simulator to approximate a model's performance with 90% accuracy. Subsequently, we've integrated this simulator with our group testing algorithms. Upon receiving the test results, we decode the output matrix using our previously introduced decoding algorithm to identify all defective items. To assess accuracy, we compare the decoded set of defective items with the actual set, thereby gauging the effectiveness of both the model and group testing algorithm relative to the baseline approach presented earlier. In our context, 'defective items' refers to a collection of firearm images.

During our work, we've also identified several promising directions for future study. In Weixin's research, they restricted the group size to powers of two, such as 1, 2, 4, 8, or 16. This has led us to consider the feasibility of utilizing trained Convolutional Neural Networks (CNNs) to work with groups of any size. Going forward, we will delve deeper into evaluating the performance of group testing algorithms under these varied conditions.

Moreover, it's important to note that the original model training utilized high-resolution images from the ImageNet database. However, in real-world scenarios, surveillance cameras often capture lower-resolution photos. To make our firearm classification system more practical, we believe the CNN should be trained on images from surveillance cameras rather than relying solely on high-resolution datasets like ImageNet.

Thank you all for your presence and the invaluable support from our supervisors and administration. I'd like to share some group photos to commemorate this unforgettable event.