**We have discussed the various challenges encountered by persons with disabilities regarding the online classes during this pandemic. However, while there are many challenges, there can be some advantages too, especially as we can now integrate various technologies in the process and make learning accessible and inclusive. Keeping these points in account, address the following questions:**

**1. a. Consider one type of disability, where you can contribute with your technical knowledge, name the disability, and what are the challenges faced by persons with this disability? [3] \***

In this part, I'd like to talk about dyslexia. Dyslexia is a learning disability characterized by difficulty reading due to problems interpreting speech sounds and learning how they relate to letters and phrases (decoding). Dyslexia, also known as reading disability, affects the regions of the brain that interpret language. Some of the most common difficulties encountered by dyslexic people include trouble forming sentences in their minds before speaking, difficulties understanding meaning, order of things, and identifying parallels between things, lousy spelling, and increased complexity of mathematical problems.

**1. b. Name one feature/ area regarding online classes, that you want to make accessible and why do you think it poses challenges to persons belonging to the concerned disability group? [3] \***

Since students are not observed in online classes and speaking is the only mode of communication, teachers struggle to determine if students are grasping the lectures properly. For dyslexic students, the condition is doubly challenging because they have trouble following the slides being shared and framing the questions they want to ask the instructor. They sometimes do not have enough time to ask their questions, and there is a significant disconnect. This causes frustration and a desire to avoid studies, which may further impair their learning and self-esteem.

**1.c. What is your proposed technical intervention/ solution? (please write in clear and specific points) [4] \***

Many dreams that were once considered to be unlikely have come true thanks to modern technology. In online courses, several technological approaches could benefit dyslexic students. It was using fonts that are soothing to people with dyslexia. Fonts that look less crowded, such as Arial and sans-serif, are the go-to fonts for making slides more appealing to dyslexic students. Using pre-recorded videos that can be shared before class gives dyslexic students more time to absorb the concepts. A natural language processing (NLP)-based question framer will assist in framing questions based on the current slide's text. This can be supplemented by a list of popular questions from which to choose. An NLP-based summarizer that incorporates the text in slides and produces a description of key points.

**1.d. How does your proposed intervention fit into the concepts of Universal Design for Learning and right-based approach for disability [3] \***  
The Universal Design for Learning (UDL) suggests developing a learning scheme that meets the needs of all student groups. Different groups of students have different needs that must be met. We discussed dyslexia in our proposed solution and thus took a move to make education more affordable, catering to the needs of dyslexic people. This also fits with the idea of a right-based approach, which prohibits any kind of discrimination against people with disabilities when it comes to their rights. Education is a fundamental right. Our technology would help eliminate prejudice against dyslexic people by offering a shared learning ground.

**2. Imagine you have a friend with Autism who has difficulty reading the textbooks. How can you help her? (propose one potential technical intervention) [4] \***

When it comes to teaching children with Autism, the traditional approach does not work – many of them are visual thinkers in general (visual learners), some rely on sounds to learn (auditory learners), while some require multi-sensory learning techniques and, in some exceptional cases, some autistic people really regress.

A technological solution will include creating an Assistive Autism application that scans the textbook with a camera, parses the image into a text file, and then uses that text file as an input to NLP algorithms that can parse the meaning of the text in a subtle way. In a significant way, there can only be two profiles for this program. For those who are primarily visual learners, we will feed the parsed text into a web scraper, which scans the internet for related videos and returns the best video that can, for all intents and purposes, illustrate the idea in a big way. With the relatively recent growth and development of NLP in understanding the meaning of sentences, this method is ultimately viable. It should be given a chance, which is very interesting. For multi-sensory and stimuli-based learners, the only viable option is the use of a very personal tutor who can really cater to his/her kind of needs and help her practically read the book in the way that the individual almost completely understands.

**3. Just like access to education is a fundamental right, likewise access to entertainment is also an integral part of quality life, however, unfortunately, most of the places or events of leisure and entertainment are inaccessible to persons with disabilities - may it be your college fest or your favorite nightclub or movie theatre. We can use technology to make these places inclusive -**

**3.a. State the disability (should not be same as your answer to question 1a.) you want to address and the challenges faced by people concerned, with specific mention to the scenario you are thinking [4] \***

We will discuss Hearing Impairment in this part.  The following are some of the possible issues that they can encounter in places of entertainment:

Difficulty interpreting movie plots and dialogues (without subtitles) in the absence of sound. Without subtitles, the whole movie-watching experience is ruined, and even with subtitles, the overall experience is not impressive for the consumer.

Missing college fest announcements made over a megaphone, all announcements in college fests are usually made over PAS, which can be overlooked by those with hearing impairment. Also festival activities are announced over the microphone, which participants with hearing difficulties will miss, forcing them to remain in the vicinity. People with hearing impairments are unable to dance to music in nightclubs due to missing beats. Cinema halls and college fests are two of my specific target markets.

**3.b. How you can contribute with technology? [4] (Do Not copy-paste answer of Question 1) \***

For moviegoers, we will introduce smart glasses for movie theatres, which will show user-specific informative subtitles. The smart glass may perform the following functions. The subtitles can be encoded in the film so that they cannot be seen with standard 3D glasses or even 2D displays. Suppose we use a coating on the glass that reveals ultraviolet or UV radiation to the naked eye. In that case, the viewer will be able to see the subtitles for the movie with the aid of this smart glass. We may also equip the glass with an active audio reader that will use IoT technology to parse the audio signal of the movie in real-time and transfer the data to a phone that will have video annotations in the glass VR. This takes care of the subtitle issue. We will use sensory targeting equipment that is fitting the seats with vibratory seats that can be used to create anticipation and thrill as a subtitle of audio cues that directors use for the same to make it a more impressive experience for those in cinema halls.

We will use an App-based announcing scheme for college fests. We will create an interface that can be updated in real-time with data and notify users about changes. As a result, people with hearing impairments will not miss a lot because the app will have updates on all that is going on with all of the fest's activities. The user will opt to "watch" a certain festival event and receive targeted notifications. When he/she wishes to partake in an exercise, he/she will be notified of the event's start time and a possible reporting time.

**4. In question 3, we talked about entertainment, but how can you use your technical knowledge to make sports accessible for a person with both visual and hearing disabilities - pick one sport and elaborate on that. [5] \***

People with disabilities should be able to participate in sports as well. A individual with both disabilities should not be prevented from participating in sports. There are a few sports where visual cues can be replaced with auditory cues, so if a person cannot feel both, we can substitute them with sensory cues.

Swimming is one of the disciplines that can be applied to all track meets in general. To compensate for the absence of visual and auditory signals, we use vibratory waterproof sensors worn as wrist and ankle bands. The method is as follows: at first, the user should align himself/herself at a specific location. The swimming lanes can be laced with a metallic line that magnetometer sensors can detect. If the user swims close to a certain line, the vibratory sensors begin buzzing; the proximity to the swimming lane divider can be adjusted for by changing the strength of the sensations and the frequency of the buzzer. If there is a wall ahead, all of the sensors will be used to send a synchronized buzz to alert the user so that he or she can plan ahead of time. As a result, the user will adjust and correct their course based on the buzzer's sensory feedback. This basic but practical approach could be extended to track events as well.

[T4SNE ASS2 - Google Docs](https://docs.google.com/document/d/1yIhQIUFtLe7n_YRhg-6ejjDeuIFenkFKQ2VBs4OKkaw/edit)

[T4SNE Assignment - Google Docs](https://docs.google.com/document/d/1mVwokkp5qsF27qOtVwHoSbqkvumEFKb4GcYAeb4pFSA/edit)