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How Are Sets Used in Real Life?

Sets are an incredibly fundamental concept not only to mathematics and computer science, but also to everyday life. Many people might be able to recognize a set in their everyday lives, but defining one is a little bit trickier. A set is a collection of objects without duplicate elements that can be used in many different ways, especially in mathematics. One might look like this, {1, 2, 3, 4} or like this {Dog, Cat, Porcupine}. Sets can also contain other sets like this, {{1, 3},{5, 6, 7}}. They are often compared to each other using operations such as intersection (∩), which looks at elements the sets share, union (∪), which takes all elements from both sets, and difference (A - B), which takes the elements that are in one set and not the other. Anything can be categorized into specific groups on the basis of some criteria, for example, music playlists.

Songs can easily become elements of a set when they are added to a playlist. Spotify, an ever growing music streaming platform, has mainly become a playlist-centric application. It is easier to listen to songs when they are grouped into playlists based on categories rather than just being hearted -Spotify's way of showing one likes a song- and added to a random grouping of all liked songs. It is important to think about how these sets create a more functional user interface and user experience.

From the user interface perspective, playlists can be filed into folders or made into collaborative playlists which help to create a neater and more organized experience for the listener. There are also photo icons at the top of playlist heads that allow the user to upload their

own photos which creates a more personalized environment. The sets of artists and dates added to the playlist can also be organized in different ways to mix up the order of the playlist and display different perspectives.

When people make their own playlists, they are able to share a collection of songs that capture a specific purpose. One might create a playlist that is full of inspiring, upbeat songs and share it with a friend who is going through a hard time. Another might create a holiday playlist that is made only to play around that time of year. These sets are not only there to compile and organize elements, they also have a purpose and are created to relate songs to each other, as well as to different places, times and people.

The act of sharing these playlists also broadens the user base for Spotify. Creating playlists is incredibly accessible on the platform and allows users to discover new artists all the time. Spotify comes out with a few new, personally tailored playlists every week called "Discover Weekly", "Release Radar" as well as around 6 "Daily Mixes". An algorithm analyzes data from playlists that have been made by the user in order to curate different playlists with different purposes. The Discover Weekly playlist recommends around 30 songs that the user has never listened to on Spotify but are similar in genre and sound to the songs that they *have* been listening to. The Release Radar combines the newly released music of popular artists and artists that the user cares about.

There is a fine line between what makes a playlist a set and what stops it from being one. If a playlist were to accidentally contain two of the same song, then it wouldn't be a set anymore. It is very uncommon for playlists to contain multiple of the same song because songs are able to be looped and replayed and wouldn't really need to be added multiple times.

The data that is placed into these sets are not always being viewed by one person. If a user chooses to share a playlist, or if they are a well known artist with many listeners, there are going to be many people interacting with them. Spotify has around 217 million users which is why it is so important that its interface can be used by many different types of people.

One can also use Spotify to find and follow their friends. This creates a set of followers and followees. People are able to view the playlists created by their friends and friends of *their* friends and can compare music tastes or see if they like the same artists. This is similar to an intersection in set theory because two different playlists might contain a lot of different songs but also might include some that are the same as in the other playlist. An example might be if there are two playlists A and B that have the songs A = {Don't Stop Believin', Jingle Bell Rock, Here Comes the Sun} and B = {Don't Stop Believin', Black Bird, Jingle Bell Rock}, then $(A \cap B)$ = {Don't Stop Believin', Jingle Bell Rock}. We also see intersections like this throughout other recommended playlists. On an opposite note, two playlists that don't contain any of the same songs would be labeled as disjoint sets/playlists.

There are many different small aspects that all relate to sets even *just* when thinking about how Spotify works. A set is so integral to even the smallest of details in our everyday lives. They help connect people on social media, categorize songs into meaningful playlists, and even help us remember what is right and what is wrong. Sets are taught to us at a young age and we don't even really realize it. When we are young, we are taught what to do and what not to do. These sets help define corrective action and allow us to function as human beings in modern society. It also teaches us to find comfort and functionality in categorization which is why

Spotify's structure seems intuitive to a lot of people. In the end, sets are what help organize our lives.