

# Music Recommendation Service

Group 2: Jason Ingram & Isaiah Martinez



# **Table of contents**

---

**01**

**Project  
Design**

**03**

**Data  
Visualization**

**02**

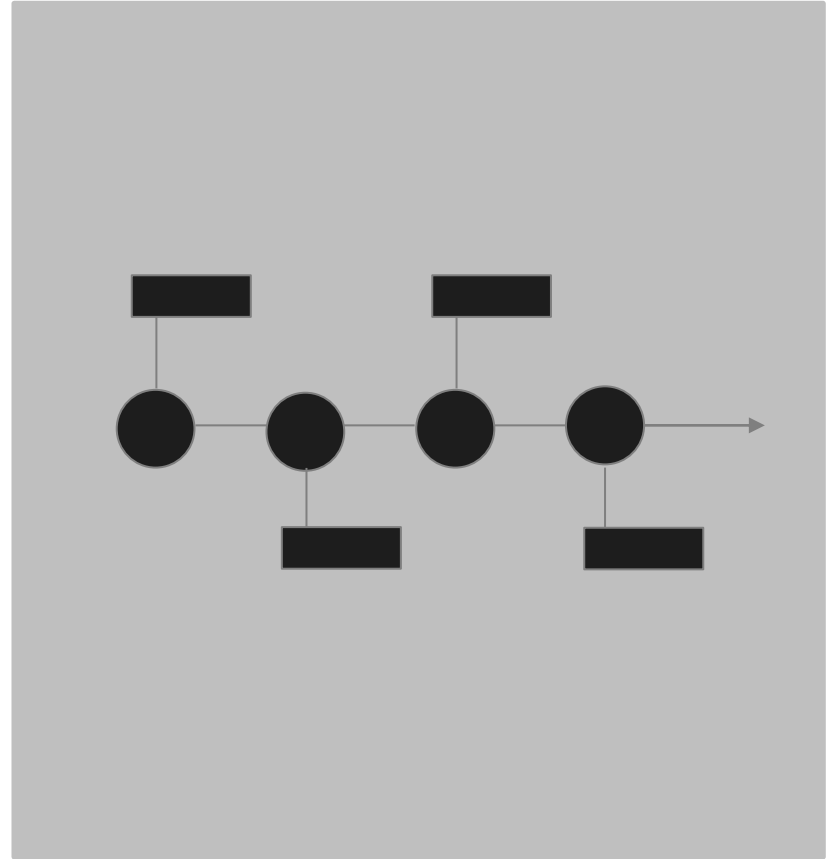
**Web  
Crawlers**

**04**

**Data  
Preparation**

**01**

# **Project Design**



# Project Description

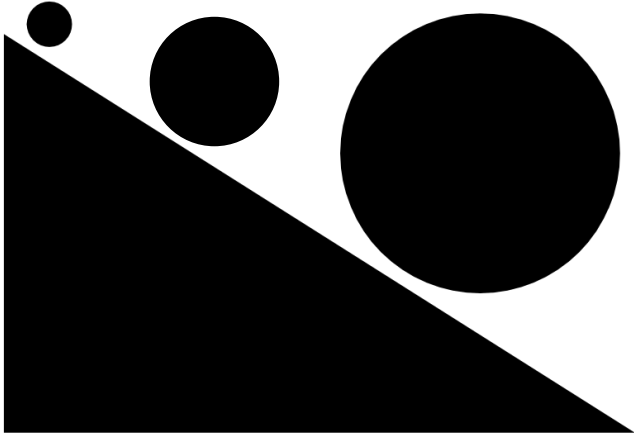
Music Recommendation  
Service:

- 2 Web Crawlers
- 2 User Data sources

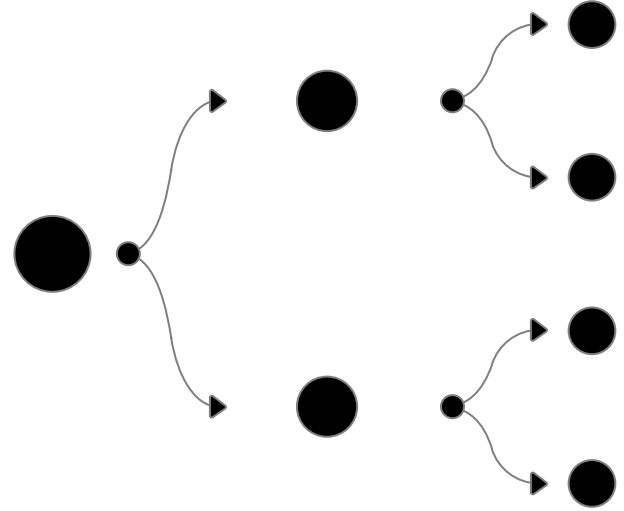


Sources for User Data

# Webcrawler Design



Snowball Effect for genres



Snowball effect for Artists

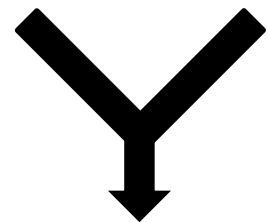
# Project Design



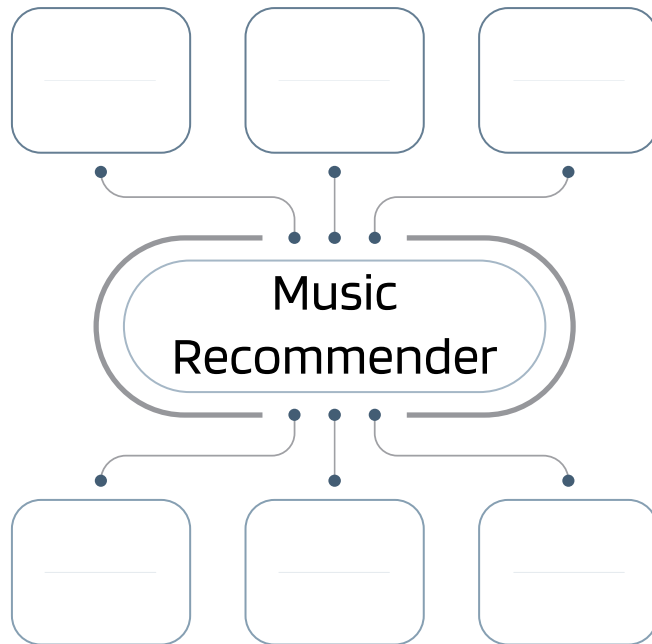
User Data



Music Data

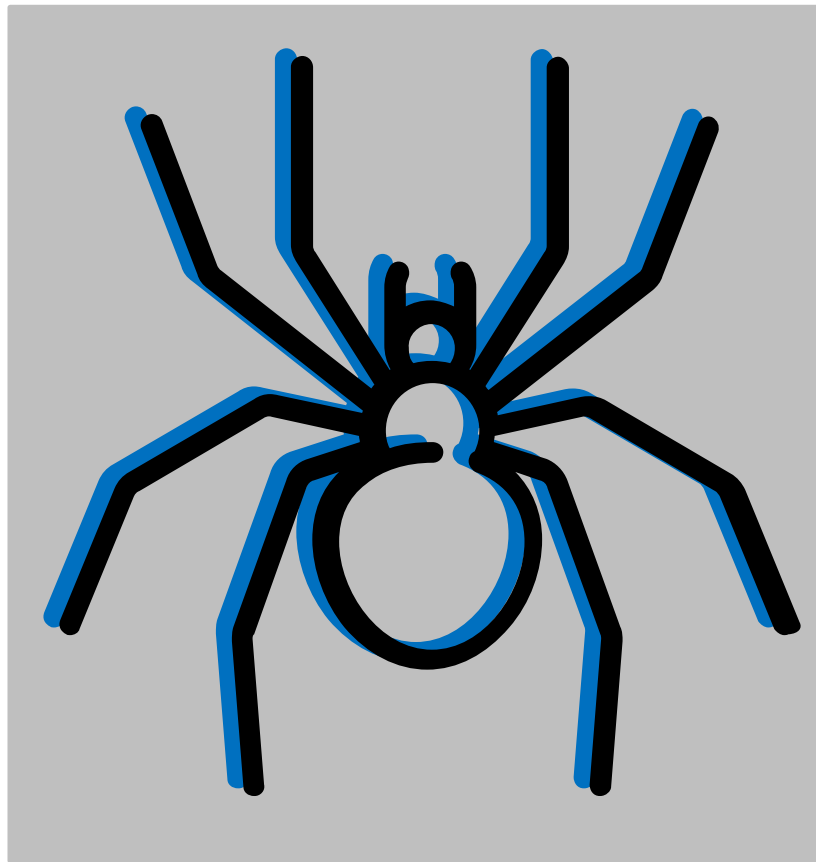


Combined  
Dataset



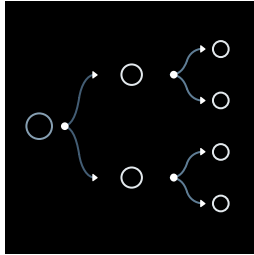
**02**

# **Web Crawlers**



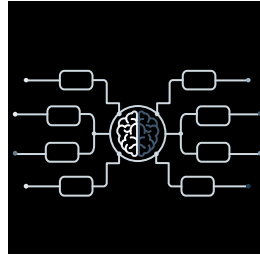
# Web Crawler Design

Isaiah



**Music Map**

Obtains Related Artists to  
a given Artist



**Last.fm**

Holds Song Information



**Script**

Stores data across several  
files



# Music Map

Type the name of an artist to find it on the map:

Muse



Artist Name to search on  
music-map.com





last.fm

🔍 Home Live Music Charts Events Features

## Muse

▶ PLAY ARTIST



Listeners **5.1M** Scrobbles **424.5M**



LATEST RELEASE  
**Absolution XX Anniversary**  
17 November 2023



POPULAR THIS WEEK  
**Supermassive Black Hole**  
39,770 listeners

Muse are an English rock band from Teignmouth, Devon, formed in 1994. The band consists of Matt Bellamy (lead vocals, guitar, keyboards), Chris Wolstenholme (bass guitar, backing vocals), and Dominic Howard (drums). They released their debut album, *Showbiz*, in 1999, showcasing Bellamy's falsetto and a melancholic alternative rock style. Their second album, *O...*[read more](#)

**Years Active** 1994 – present (30 years)  
**Founded In** Teignmouth, Devon,  
England, United Kingdom

### Similar To

[View all artists](#)



Royal Blood



Nothing But  
Thieves



Placebo

alternative rock

rock

alternative

progressive rock

british

+ [View all tags](#)

Artist page

# Last.fm

alternative rock

rock

alternative

progressive rock

british



View all tags

View all Artist Tags

## Tags

+ ADD TAGS

alternative rock

Including Muse, Radiohead and Red Hot Chili Peppers

rock

Including Red Hot Chili Peppers, The Beatles and Muse

alternative

Including Radiohead, Coldplay and Muse

progressive rock

Including Pink Floyd, Muse and Porcupine Tree

british

Including The Beatles, Arctic Monkeys and Oasis

muse






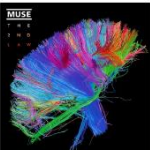






Including Muse, Soundivers and John Most

indie

Including Arctic Monkeys, Radiohead and The Killers

# Last.fm

All Albums Most popular ▾

 <p><b>Black Holes and Revelations</b> 2,732,386 listeners 30 Jun 2006 · 11 tracks</p>	 <p><b>Absolution</b> 2,349,202 listeners 21 Sep 2003 · 14 tracks</p>	 <p><b>Origin of Symmetry</b> 1,667,043 listeners 16 Jun 2001 · 11 tracks</p>	 <p><b>The Resistance</b> 1,535,689 listeners 9 Sep 2009 · 11 tracks</p>
 <p><b>Showbiz</b> 1,058,413 listeners 4 Sep 1999 · 12 tracks</p>	 <p><b>The 2nd Law</b> 822,164 listeners 24 Sep 2012 · 13 tracks</p>	 <p><b>Drones</b> 466,976 listeners 5 Jun 2015 · 12 tracks</p>	 <p><b>Simulation Theory (Super Deluxe)</b> 233,894 listeners 9 Nov 2018 · 21 tracks</p>
 <p><b>Black Holes &amp; Revelations</b></p>	 <p><b>Supermassive Black Hole</b></p>	 <p><b>Will Of The People</b></p>	 <p><b>Dead Star / In Your World</b></p>

Collect all albums

# Last.fm

Muse

## Black Holes and Revelations

[▶ PLAY ALBUM](#) [🔖](#) [⋮](#) Listeners **2.7M** Scrobbles **71.5M**

Black Holes and Revelations is the fourth studio album by English alternative rock band Muse, released on 3 July 2006. Recording was split between New York and France, and it was

**Length** 11 tracks  
**Release Date** 30 June 2006

Desired information:

- Album Name
- Release Date

Tracklist				Running order ▾
1	▶	♥ Take a Bow	4:42	730,075 listeners
2	▶	♥ Starlight	3:59	1,650,086
3	▶	♥ Supermassive Black Hole	4:01	1,978,394
4	▶	♥ Map of the Problematique	5:22	850,353
5	▶	♥ Soldier's Poem		656,172
6	▶	♥ Invincible	6:15	723,283
7	▶	♥ Assassin	3:31	705,503
8	▶	♥ Exo-Politics	3:53	627,943
9	▶	♥ City of Delusion	4:48	623,333
10	▶	♥ Hoodoo		563,683
11	▶	♥ Knights of Cydonia	6:06	1,275,079

Album Tracklist

# Last.fm

## Knights of Cydonia

▶ PLAY TRACK



Listeners  
**1.3M**

Scrobbles  
**11.7M**

"Knights of Cydonia" is a song by English rock band Muse and is the closing track on the British release of their 2006 album Black Holes and Revelations. The song's title ... [read more](#)

Length **6:06**

Lyrics No one's gonna take

alternative rock

rock

epic

alternative

muse



[View all tags](#)

Song Length

## Tags

+ ADD TAGS

alternative rock

Including Muse, Radiohead and Red Hot Chili Peppers

rock

Including Red Hot Chili Peppers, The Beatles and Muse

epic

Including The Synthetic Dream Foundation, Two Steps from Hell and E.S. Posthumus

alternative

Including Radiohead, Coldplay and Muse

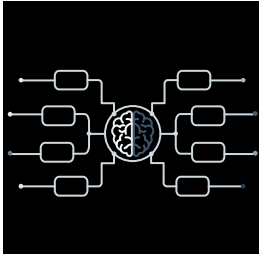
muse

progressive rock

Song Tags

# Web Crawler Design

Jason



**All Music**

Holds Genre and Song  
Information

**Script**

Stores data into a csv

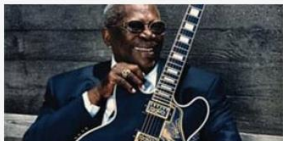
# All Music

## Genres



### Avant-Garde

John Zorn, Steve Reich, Brian Eno



### Blues

B.B. King, Bessie Smith, Muddy Waters



### Children's

Raffi, They Might Be Giants, Dan Zanes



All Genres



## Avant-Garde Subgenres & Styles

### Improvised Music ▼

Creative Orchestra  
Free Improvisation  
Improvisation  
Structured Improvisation

### Modern Composition ▼

Computer Music  
Drone  
Experimental  
Microtonal  
Minimalism  
Modern Composition  
Musique Actuelle  
Musique Concrète  
Post-Minimalism  
Tape Music

### Sound Art ▼

Conceptual Art  
Mixed Media  
Noise  
Plunderphonics  
Process-Generated  
Radio Works  
Sound Art  
Sound Collage  
Sound Sculpture

All Sub-Genres



# All Music

## Avant-Garde Song Highlights

**Idalah-Abal**

John Zorn

Bar Kokhba

**Gypsy Violin**

Harold Budd


Harold Budd

All Songs



**Idalah-Abal**

Bar Kokhba

STREAM OR BUY: 

**Composed by**

**John Zorn**

**Release Year**

**1996**

(incorrect year?)

**Genre**

**Avant-Garde  
International  
Jazz**

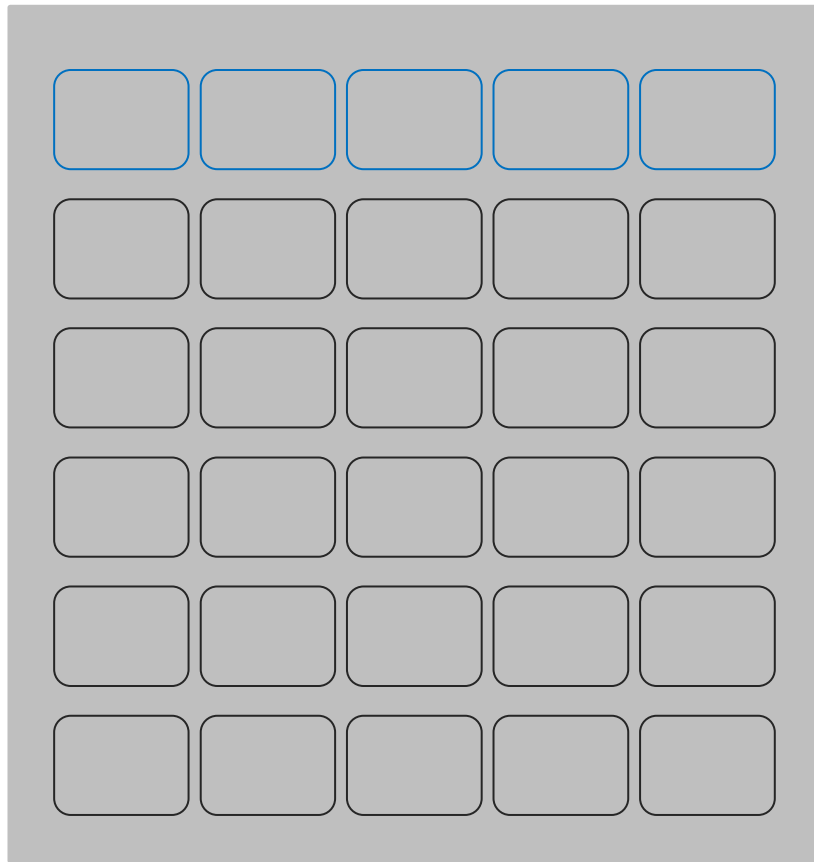
**Styles**

**Global Jazz  
Jewish Music  
Post-Bop  
Chamber Jazz**

Song Information

**03**

# **Data Visualization**



## 1

1

## CSV file combined and imported into R

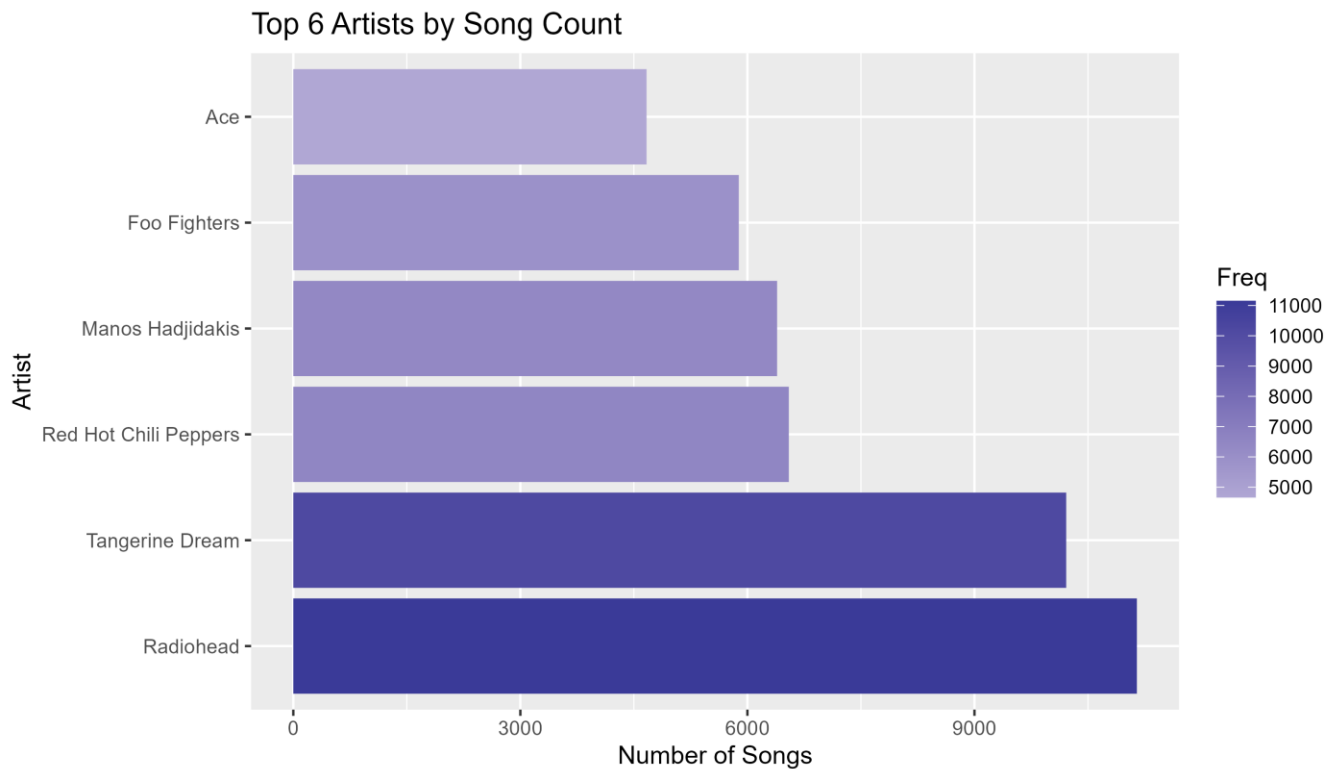
# > 100,000

Total Songs with information\*

▶ songData

133204 obs. of 6 variables

# Top Artists by Song Count



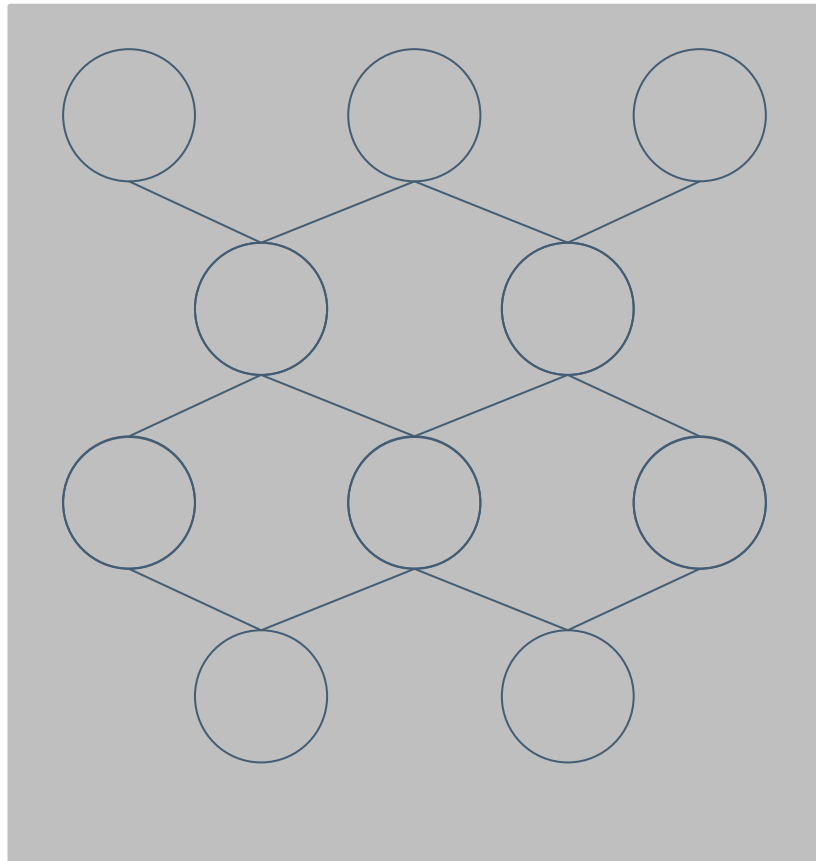
# Unique Artists

unique artists			
[1] "Villagers of Ioannina City"	"Black Hat Bones"	"Transidelia"	"Thrax Punks"
[6] "MOLYBARON"	"Nikos Ksilouris"	"Slomosa"	"1000mods"
[11] "Sun of Nothing"	"Sokratis Malamas"	"Nightstalker"	"Ohms"
[16] "Leo Moracchioli"	"Nephorash"	"Monkey3"	"Sleepwolf"
[21] "Manos Hadjidakis"	"My Sleeping Karma"	"Silent Island"	"Silent Gate"
[26] "Blackbraid"	"Daliborovo Granje"	"Universe217"	"Ganga"
[31] "Pavlos Sidiropoulos"	"Frayle"	"Khonsu"	"Socrates"
[36] "Swan Valley Heights"	"Giannis Kotsiras"	"Locomondo"	"Hashiya"
[41] "Thanasia papakonstantinou"	"Youngblood Supercult"	"Those who Ride with Giants"	"Aphrodites Child"
[46] "Osjan"	"Natural Acoustic Band"	"Atman"	"Quintessence"
[51] "Manson Family"	"Zaum"	"Daemonia Nymphe"	"Suns Of Arqa"
[56] "Villagers of Ioannina city"	"Dando Shaft"	"Stephan Micus"	"Bong"
[61] "Robert Fripp & Brian Eno"	"Tangerine Dream"	"NA"	"Muse"
[66] "Arctic Monkeys"	"Radiohead"	"Coldplay"	"Franz Ferdinand"
[71] "Oasis"	"The Strokes"	"Placebo"	"Red Hot Chili Peppers"
[76] "Royal Blood"	"Queens Of The Stone Age"	"(G)I-dle"	"Dreamcatcher"
[81] "IZ*ONE"	"Kamamo"	"ITZY"	"CLC"
[86] "Blackpink"	"Kard"	"Loona"	"Red Velvet"
[91] "Chungha"	"K.A.R.D"	"Gfriend"	"K/DA"
[96] "LOONA 1/3"	"Dreamcatcher"	"Stray Kids"	"BTS"
[101] "Aespa"	"Solar"	"DreamNote"	"Seojin"
[106] "ONEUS"	"Cherry Bullet"	"STAYC"	"Fromis_9"
[111] "3YE"	"Little Mix"	"MoonByul"	"Girls' Generation"
[116] "FIFTY FIFTY"	"JISOO"	"NMIXX"	"Exo"
[121] "(G)I-DLE"	"odd eye circle"	"Gwen"	"Weki Meki"
[126] "Cignature"	"MOMOLAND"	"Purple Kiss"	"HINAPIA"
[131] "xi"	"ANS"	"Cix"	"Pixy"
[136] "ENHYPEN"	"Rolling Quartz"	"Pinkfantasy"	"NiziU"
[141] "ONM"	"ONM"	"Golden child"	"Sunmi"
[146] "RM"	"SuperM"	"SEVENTEEN"	"Nct 127"
[151] "LE SSERAFIM"	"NewJeans"	"IVE"	"EXID"
[156] "CHUNG HA"	"IU"	"Kpop"	"Hyuna"
[161] "SULLI"	"Spink"	"Soeul"	"Soeul"
[166] "NELL"	"Aoa"	"Spica"	"Ladies Code"
[171] "9MUSES"	"Got7"	"Gain"	"Lee Hyori"
[176] "Somi"	"Pretty Savage"	"JENNIE"	"Kep1er"
[181] "Got the beat"	"FRESTIN"	"L.O.L"	"Hello Venus"
[186] "Sonamoo"	"Oh my Girl"	"Fiestar"	"Dia"
[191] "4minute"	"Vezl"	"Laboum"	"BESTIE"
[196] "Girls' Generation"	"f(x)"	"SISTAR"	"Dalshabet"
[201] "Forever Young"	"YDASOBI"	"Big Bang"	"Now United"
[206] "Troy"	"Nct"	"South Club"	"Minzy"
[211] "Somin"	"Eric Nam"	"Astro"	"Minzy"
[216] "MCND"	"LEE SUHYUN"	"Hiphop"	"DKB"
[221] "Amber Liu"	"Yoon"	"RnB"	"Yany"
[226] "One Ok Rock"	"Eddy Kim"	"Nu'est"	"Olivia Hye"
[231] "Girlfriend"	"Billlie"	"Wayv"	"YUKIKA"
[236] "Xdinary heroes"	"Suho"	"A.C.E"	"SEHUN"
[241] "Newkidd"	"Limitless"	"Pentagon"	"TREASURE"
[246] "Go & Top"	"Boy Story"	"The Boys"	"N.Flying"
[251] "B.I"	"Hip Hop Hoodies"	"Fields of the Nephilim"	"Love Like Blood"
[256] "Taeyeon"	"Ariana Grande"	"Mobb"	"EXO K"
[261] "G Dragon"	"Daesung"	"Migld"	"Taemin"
[266] "Jung Joon Young"	"Hotshot"	"Marina One"	"Nct 1st"
[271] "Charmina"	"Park Bom"	"Suboi"	"El Arrebato"
[276] "MIYEON"	"JINHO"	"Minnie"	"Sandara Park"
			"Alkinoos Ioannidis"
			"Pyx Lax"
			"Anser"
			"Vatha Sidra"
			"Obsidian Gate"
			"Planet Of Zeus"
			"Papakons tantinou"
			"The Faith And The Muse"
			"Magick Brother & Mystic"
			"Orient Expressions"
			"David And Steve Gordon"
			"Brian Eno & David Byrne"
			"The Killers"
			"Kings of Leon"
			"Foo Fighters"
			"Everglow"
			"Twice"
			"Ikon"
			"TOMORROW X TOGETHER"
			"ATEEZ"
			"Ruse"
			"BVNDIT"
			"Sumni"
			"Day6"
			"Weekly"
			"April"
			"BOL4"
			"Ace"
			"Hues"
			"WooSung"
			"SVT"
			"HyoLyn"
			"CL"
			"Bolbbalgard"
			"Lee Hi"
			"Kep1er"
			"Gugudan"
			"Lovelyz"
			"Nine Muses"
			"Monsta X"
			"K-Pop"
			"Akdong Musician"
			"AKMU"
			"Dean"
			"Pop"
			"Olivia Hye"
			"YUKIKA"
			"SEHUN"
			"Cravity"
			"N.Flying"
			"Diary of Dreams"
			"Top"
			"Kris Wu"
			"Nct 1st"
			"Rnla"

Over 200 artists obtained

# **04**

## **Data Preparation**



# Data Cleaning



Non-genre tags

Song.Length
1:21
7:45
Add lyrics on Musixmatch
6:47
9:20

No time format  
for song length

Date.Released
25 November 2011
25 November 2011
25 November 2011
2011
2011
2011

Some release dates  
only give the year

Additional Ideas:

- Remove duplicate data
- Obtain User Data from API



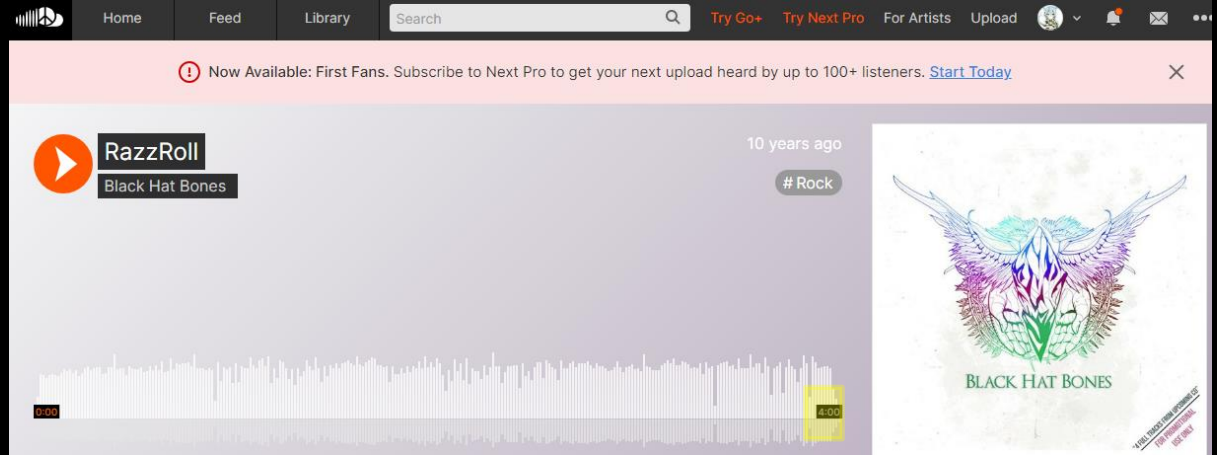
# Data Cleaning Solutions



Remove the Non-genre tags manually

Song.Length
7:31
7:45
Add lyrics on Musixmatch
6:47
9:20

Use secondary sources (websites) to obtain song lengths



# Data Cleaning Solutions

Date.Released
25 November 2011
25 November 2011
25 November 2011
2011
2011
2011

1.


RazzRoll	4:00	Black hat bones	Black Hat Bones	25 November 2011
Bleed In Face	4:28	Black hat bones	Black Hat Bones	25 November 2011
Old Charlie	4:25	Black hat bones	Black Hat Bones	25 November 2011
Old Charlie	4:25	Black Hat Bones Promo 2011	Black Hat Bones	2011
Bleed In Face	4:28	Black Hat Bones Promo 2011	Black Hat Bones	2011
Razzroll	Add lyrics on Musixmatch	Black Hat Bones Promo 2011	Black Hat Bones	2011



Several solutions:

1. Find a similar song name and delete row if found (redundant song)
2. Find external source containing the song information if not redundant

2.



BLACK HAT BONES

15/20

Band Name	Black Hat Bones
Album Name	Black Hat Bones
Type	EP
Released date	25 November 2011



# Questions?

## Thanks for Listening

**CREDITS:** This presentation template was created by **Slidesgo**, including icons by **Flaticon**, infographics & images by **Freepik**