

1. Project Proposal

Project Description:

The name of the project is “EXO-Revolution”, which is an application of “Dance Dance Revolution”. This is mainly designed for EXO-L, the fan of EXO. The game rule is to hit the music note coherent to music as precisely as you can.

Competitive Analysis:

There are several similar games online, such as dance dance revolution as well as piano games. These kinds of games all require players to click or hit the piece based on the music notes.

As for my game, the similarity with other games is that we all utilize music onset detection and pygame to play music, and display the score to the user at the end. The special point for my game is that except for onset detection, players can choose to play with their idols, which is the adaptation of AI algorithms. The performance of AI will be based on players' performance. Also, players can see their previous and current scores (history information) as represented by plot in the history mode. Moreover, instead of using matplotlib, the user scores and AI scores are shown by tkinter graphics in statMode.

Structural Plan:

When the player enters the game, they can enter their names and continue. To continue, there are mainly three sections: select songs, play games, and history. In the select songs section, the player can upload their favorite songs and the information(the beat map) will be stored. After making the final decisions for song selections, the player can enter the game mode. In the game main page, the instructions will be listed and the player can select the game level and start the game. During the game, the player can see their current scores in detail, including the score of free-hits, total scores, and multipliers. If they choose to play with idols, they will see the scores of themselves and their idols at the same time. After the game is finished, the player will be directed into the history section to see their score information. At the end, they can either leave the game or play again by the previous song or by a new song.

Module: aubio, pygame, random

```
from cmu_112_graphics import *
from aubio import source, onset
import pygame
from beatLst import onsettetimes_list
import random
import math
import decimal
import copy
```

Algorithmic Plan:

In the music process sections, I use beat detection. Specifically, by using the module Aubio (onset detection), I can generate a beat map based on whatever music imported by the players. After getting this information, I processed the time data by converting them to the closet numbers which are the multiple of the value of *timerDelay*. In this way, we can determine the time to drop music notes by the drop time we calculated and the fixed traveled time(the time traveling from the top to the bottom trackers).

[TP2 Update]

Also, I will use AI algorithms to add a mode which enables players to play with their idols(which are the “AI” here). In brief, the AI’s performance is based on the player’s performance and the beat map we generated by onset detection. In detail, by calculating the average position and standard deviation of each note position every timerFired, we can get a tolerance interval and tolerance value for the AI to hit the music piece. This will also use a random module (random.gauss(mu, sigma)).

By using CMU_112_graphics, I calculate the specific position of each score and display the score as a graphic to users without using matplotlib.

[TP3 Update]

Makes beat time more precisely by changing the playMusic time

Timeline Plan:

TP1- beatmap generation (finished)

TP2- AI feature

TP3- display scores by plots

Version Control Plan:

I will upload all files into google drive on time.

The screenshot shows a Google Drive interface. On the left, there's a sidebar with 'New', 'Priority', 'My Drive', 'Shared with me', 'Recent', 'Starred', and 'Trash'. Below that is a 'Storage' section showing '761.2 MB used'. The main area displays a list of files in a folder named 'TP'. The files are listed in descending order by last modified date. The columns show 'Name', 'Owner', 'Last modified', and 'File size'. The files include: __pycache__, .DS_Store, 1.beatmap.txt, 1.mp3, 1.py, 2.py, beatLst.py, cmu_112_graphics_openCV.py, cmu_112_graphics.py, Don't Go.mp3, download.wav, draft.py, and EXO-Revo.py. Most files were last modified on April 11, 2022, except for cmu_112_graphics.py which was last modified on April 6, 2022, and cmu_112_graphics_openCV.py which was last modified on April 4, 2022.

Name	Owner	Last modified	File size
__pycache__	me	Apr 11, 2022 me	—
.DS_Store	me	Apr 11, 2022 me	6 KB
1.beatmap.txt	me	Apr 11, 2022 me	195 bytes
1.mp3	me	Apr 10, 2022 me	222 KB
1.py	me	Apr 10, 2022 me	64 bytes
2.py	me	Apr 10, 2022 me	17 KB
beatLst.py	me	Apr 11, 2022 me	1 KB
cmu_112_graphics_openCV.py	me	Apr 4, 2022 me	34 KB
cmu_112_graphics.py	me	Apr 6, 2022 me	34 KB
Don't Go.mp3	me	Apr 8, 2022 me	4.9 MB
download.wav	me	Apr 11, 2022 me	296 KB
draft.py	me	Apr 10, 2022 me	3 KB
EXO-Revo.py	me	Apr 11, 2022 me	25 KB

2. Storyboard

See next page

Welcome to EXO-Revolution

Click the mouse to enter your name!

ory!<YOU WILL SEE GAME RULES AFTER ENTERIN



Select Your Song

Play Game!

History

EXO is a South Korean-Chinese boy band based in Seoul, consisting of nine members: Xiumin, Suho, Lay, Baekhyun, Chen, Chanyeol, D.O., Kai and Sehun. The band was formed by SM Entertainment in 2011 and debuted in 2012. The fan name is EXO-L.

File Path of Your Song:

No song so far...

You must import song before playing game

Click the white box above to import song

Press e: back to main page

Press l: see your song list & play game!





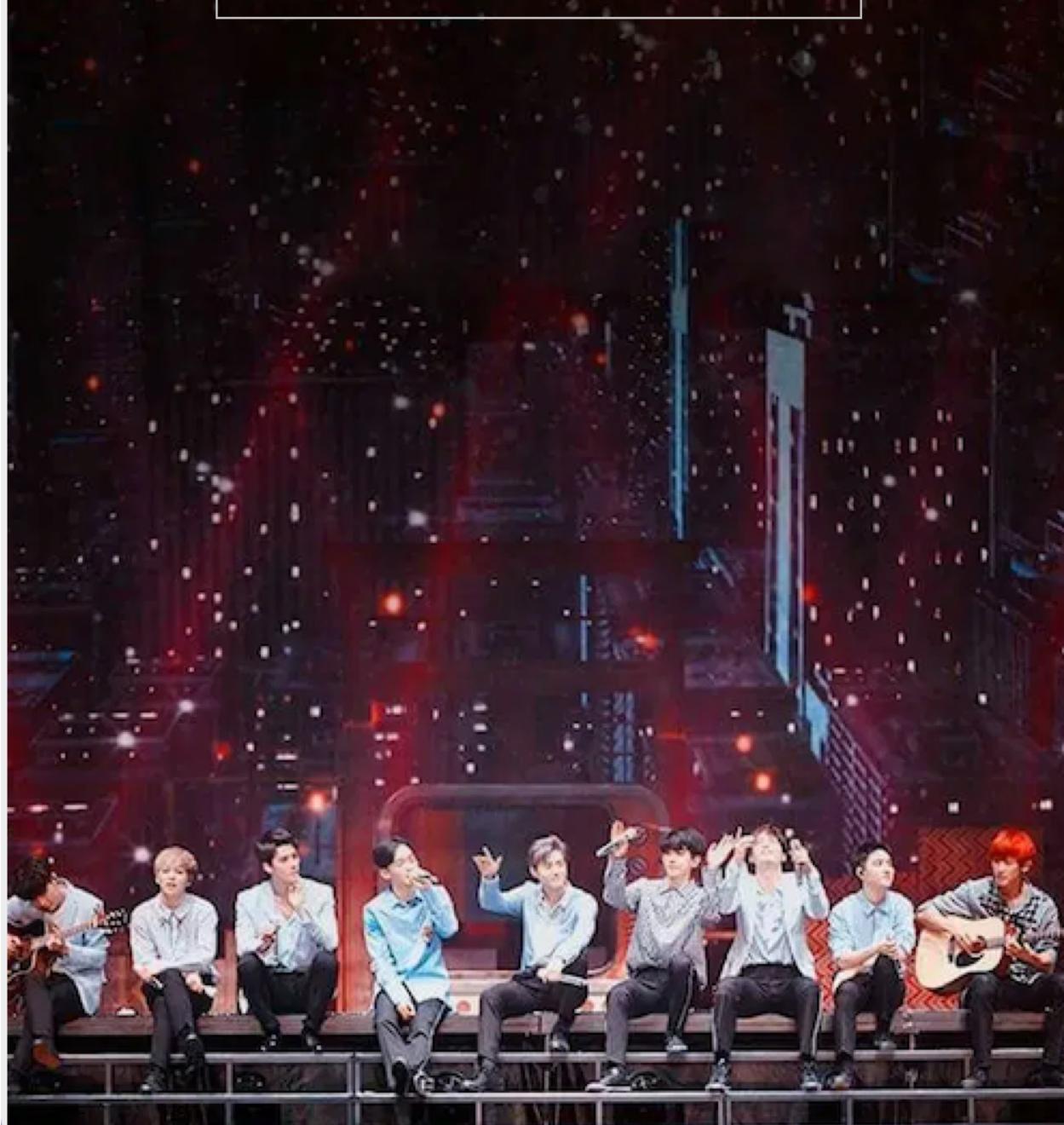
TopLevelApp (500 x 700)

Final Decision: Type your song number

(song number: the number in the bracket before song name)

(Press s: return to select_Song page)

[0]. 1.mp3



TopLevelApp (500 x 700)



EXO-L, Select Game Level !

(Press e: back to main page)

EASY

NORMAL

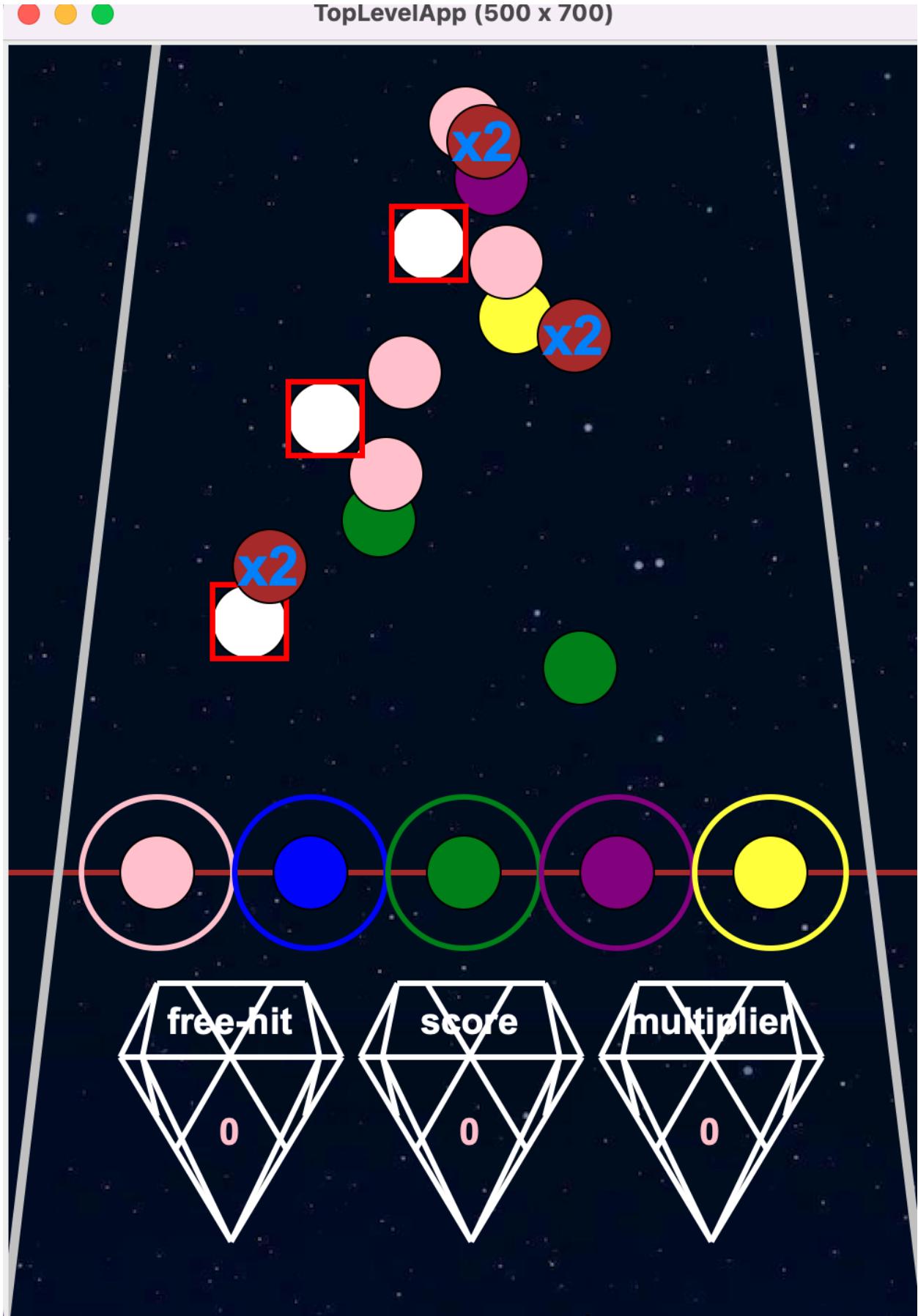
HARD

There will be five trackers, and pieces will be randomly generated. From left to right, each tracker represents a letter in [q,'w','e','o','p'], still from left to right.<hit as precise as you can!>

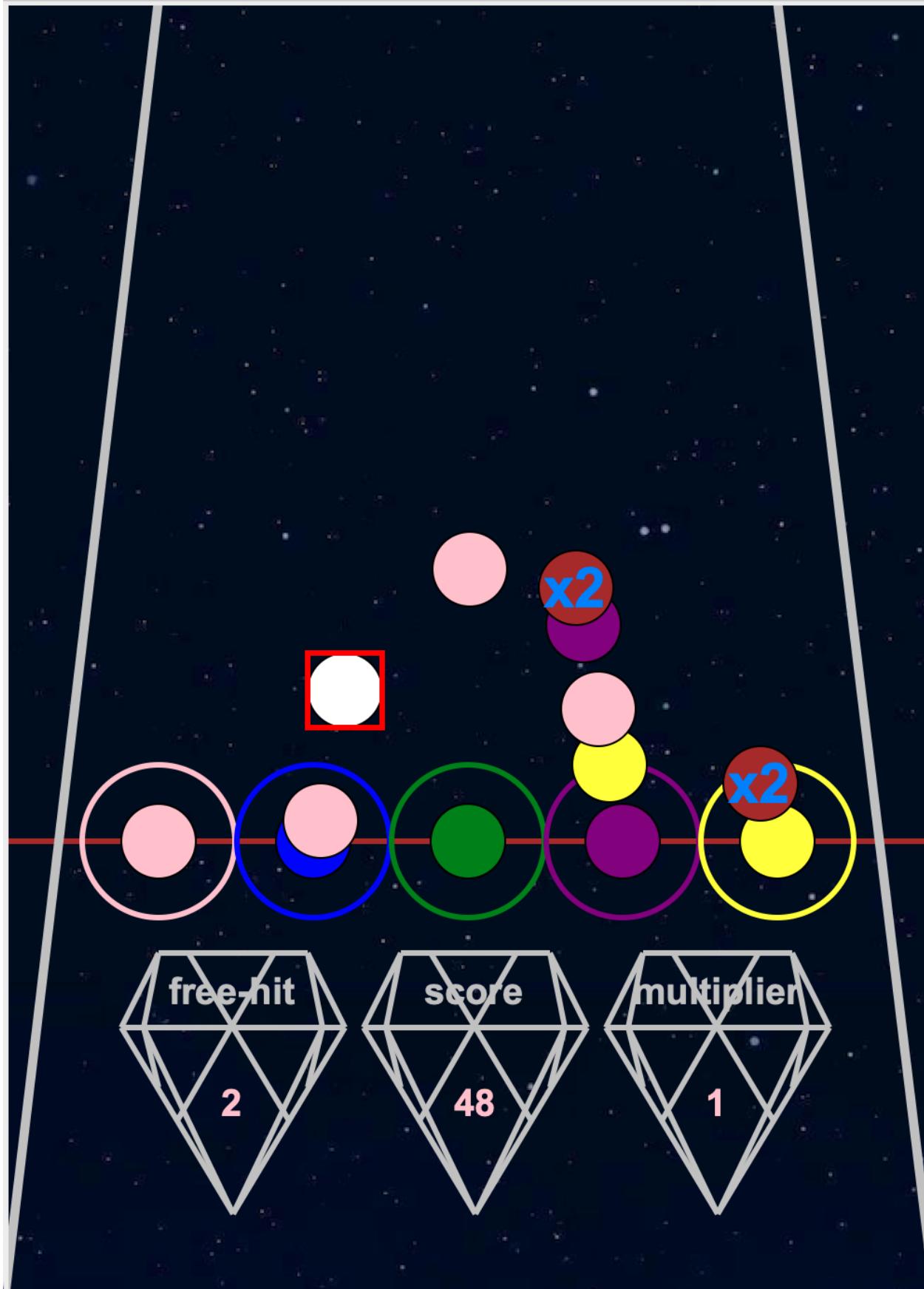
* Perfect = 10 points; Great == 5 points; Missing = -20 points *

* Click on 'free-hit'(circle inside red box) = extra 1 point *

* Hit multiplier(circle with number) on time, score multiplies by 2 *



TopLevelApp (500 x 700)



ress f: return to main page! After BATTLE mode, click
Your History

Peter Pan.mp3-intro: 1068

Peter Pan.mp3-practice: 345

Peter Pan.mp3-battle: 223



Press s: return to history page!

Me: red
EXO: blue

Don't fight the feeling



My Total Score: 907042

EXO Total Score: 940

