## Singing notes

From nursery rhymes to karaoke, people love to sing. A considerable industry within computer science has grown to support these activities, particularly in video games and the recording industry. In this étude, you will write a program that analyses real-world samples of singing, and identifies the musical notes being sung. Your program is due no later than **15 May, 5:00pm**. You will then present your approach, challenges, and findings as a group to the class the following week in the town hall on **21 May**.

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### Task

Provided with this étude are two .wav files. Each file contains a sample of one person singing a short musical melody. Write a program that analyses each sample, and identifies the musical notes being sung. Here is a list of musical notes and their corresponding frequencies. Your program should output to the console the sequence of notes, separated by hyphens. For example, C4-E4-G4-C5-E4-C4.

Your presentation will need to be 3 minutes or less, and will be followed by 2 minutes of questions. Due to the number of groups, these times will be strictly enforced. Given that you will all be presenting on the same topic, think about how you can make your presentation more interesting and engaging. You may wish to use figures, or going beyond the spec. For example, can your program guess which singer was male, and which was female? (hint: this is an open ended and challenging question).

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### Hints

There are a range of frequency estimation methods that you can consider using for this challenge. Also, the human voice imperfect at producing precise pitch, even for highly trained singers. One challenge you will face is that people don't hit the exact frequency, and the transition between notes is not clean. There is no 'right' answer, but there are wrong ones.

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### Relates to Objectives

1.4 2.1 2.3 2.6 2.8 3.2 3.2 3.5 4.1 4.2 4.8

(3 points, Group)