W04 Feb 05 (D2) Simplified ABC music notation

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All Sections

These questions are presented under the following assumptions:

- They may be selected to be part of the final exam
- Responses must be posted by the students (not me)
- I will call your attention to any mistakes or wrong content posted in response

Consider a sequence of ASCII codes representing musical notes that need to be stored in a RAM with the objective of controlling the frequency of a square wave output. The UART, the RAM block, and the programmable waveform generator, are all part of the datapath of the FSMD represented below. The behaviour of the circuit may be described as follows:

- The output will remain at logic '0' until a rising edge is detected in the "Play" input
- Once the "Play" input is activated, the square wave output starts with a frequency defined by the content of the first memory position
- After 0.5 sec. the frequency of the square wave changes to the value defined by the second memory position
- The process repeats itself up to the last code received through the RS232 port, and the output will revert to logic '0' afterwards
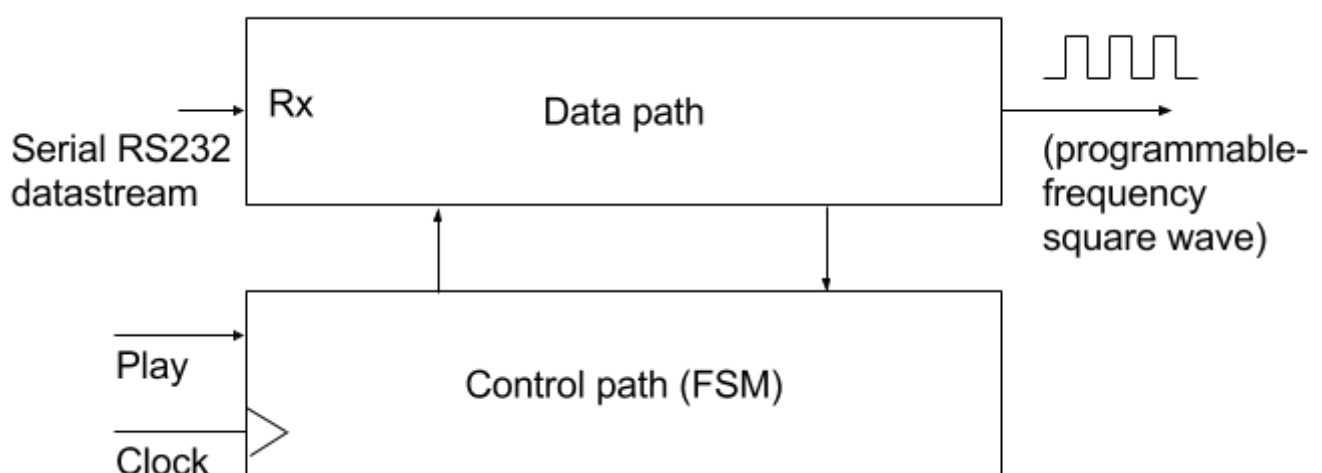
Departing from the ABC music notation format, introduce a number of reasonable simplifications that will minimize the storage requirements for the "sequence of ASCII codes

representing musical notes" referred above.

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