CSIS0235/COMP3235 Programming Final Exam

12.12.2014, 2:30-5pm

You are a composer, and your (girl/boy)friend is a typist. You compose using d (for Do), r (Re), m (Me) …, which however is all Greek to your friend. You want to compose a tune and let him/her play the tune using an online piano (virtualpiano.net) and with the computer keyboard. Your task: to create a translator using Flex/Bison that converts your music notation into computer keystrokes.

Your notation (for three octaves only):

- Notes in the normal octave: d, r, m, f, s, l, t (for Do, Re, Me, Fa, …)
- Notes in the lower octave: _d, _r, _m, …
- Notes in the higher octave: ^d, ^r, ^m, …
- Brackets, e.g.: ^(drm) = ^d^r^m, _(ssls^dt)
- Durations (half note, whole note, and multiples of whole notes). E.g.:
  - d Do, one beat (whole note)
  - d- a longer Do, two beats
  - d--- Do, four beats
  - [d] a short Do, half a beat (half note)
  - [drmf] Do, Re, Me, Fa, all short/half notes
  - (ltd)- = l-t-d-
- Variables (and assignment) using single capital letters; the assignment is terminated by a semi-colon, and so could spread over multiple lines. Variables must be declared/assigned a value before they are used. E.g.:
  - X = _([ss]ls^dt-); … $X …
- Repetition, non-zero positive integer followed by { }.
  - Please refer to the "We Wish You a Merry Christmas" example.

Translation table for music notation to keystrokes:

_d	8
_r	9
_m	0
_f	q
_s	w
_l	e
_t	r
d	t
r	y
m	u
f	i
s	o
l	p
t	a
^d	s
^r	d
^m	f
^f	g
^s	h
^l	j
^t	k

In the keystrokes output, whole notes stand alone and separated by a space (or more spaces, up to you). Half notes are packed together (no space), and longer notes have one or more trailing hyphens (same as in your notation).

Some example tunes:

Your music notations are on the left, and the output keystrokes for your friend on the right. The newlines are for convenience or cosmetic reason only.

Happy Birthday

[ss]ls^dt-	oo p o s a-
[ss]ls^r^d-	oo p o d s-
[ss]^(smd)tl-	oo h f s a p-
^([ff]mdrd---)	gg f s d s---

We Wish You a Merry Christmas

2{	
_sd[drd_t]_(ll)	w t tytr e e
lr[rmrd](ts)	e y yuyt r w
_sm[mfmr]d_l	w u uiuy t e
[_(ss)]_lr_td-	ww e y r t-
}	w t tytr e e
	e y yuyt r w
	w u uiuy t e
	ww e y r t-

Ode to Joy

A=mmfssfmrddrm	
$Amrr-	u u i o o i u y t t y u u y y-
$Ardd-	u u i o o i u y t t y u y t t-
rrmdr[mf]mdr[mf]mrdr_s-	y y u t y ui u t y ui u y t y w-
^($Ardd-)	f f g h h g f d s s d f d s s-

Error handling:

You may assume the composer will never make a (syntactic) mistake, such as "_^m". So no error checking and handling is necessary.

Submission:

Zip your files into one zip (or rar) file and submit it via Moodle. Your files should include a readme which may include such information as the platform you're using (Linux or Mac or …), instructions to compile and run your program, any special notes (such as what you have or have not done) which you'd like to draw our attention on, and tunes you created, if any.

* If you run out of time, you may skip the features above that are in gray. It is better to have something completely right than trying everything but then nothing works.

** THE END **