UKLO Round 2 March 2015

Aymara rules

This problem concerns Aymara, an indigenous language
spoken in Bolivia, but it also raises general questions about
the kinds of rules that are possible for 'phonotactics' – for
explaining how sounds should be put together to make
words. Not just any combination of sounds can be a word; for instance, in English *blid*
is a possible word (although it doesn't actually exist), but *bnid* is impossible because
it breaks the phonotactic rules of English. There are many types of rules one can write
to describe sound patterns. In this problem we consider three rule types:

Type A: These constraints require that a certain sound occur either an even or odd
number of times. We write Type A constraints as follows:
  either **X=Even**, meaning the sound X must occur an even number of times,
  or **X=Odd**, meaning the sound X must occur an odd number of times.
For example, b=Even requires that there be an even number of b's in every
word. Thus, b=Even rules out words like "bas" or "bisbanib" while allowing
words like "tas" or "bistanib". The rule b=Odd would do the exact opposite:
allow "bas" and "bisbanib" but rule out "tas" and "bistanib".
Type B: These constraints prohibit a certain sound from occurring right before
another sound. We write Type B constraints as follows:
  *XY, meaning that X must not occur right before Y.
For example, *bn prohibits b from immediately preceding n. Thus, *bn rules
out "abnik" as a possible word while allowing words like "atnik" or "anbik".
Type C: These constraints prohibit a certain sound from occurring before another
sound at any point in the word. We write Type C constraints as follows:
  *[XY], meaning that X must not occur before Y, no matter what may or may
  not come in between.
For example, *[bn] prohibits b from preceding n anywhere. Like *bn, *[bn]
allows words like "atnik" or "anbik" and rules out "abnik", but unlike *bn,
*[bn] also rules out "abitnik".

In this problem, you will write constraints in the forms just described in order to
account for some of the phonotactics of Bolivian Aymara. The following tables list
acceptable and unacceptable words in Aymara:

Acceptable

kawki	sipita	pisi	janana	purapa	alwa	qawa
kikpa	oqara	kunka	tarkaka	seqe	qemi	putu
qolqeni	yuru	taqe	jiliri	qapa	jaqet	mayni
toqe	nayra	tukjata	tiwula			

Unacceptable

| ekawu | okatu | qaqira | kutaqa | qulwaqa | maqetuq | toqaki |

Q.4.1. write a set of constraints that will rule out all of the bad forms while permitting
all of the good forms. Use as few constraints as possible. Follow the format described
above for writing constraints. Note: you don't need to account for every pattern you
might find. You will lose points only for ruling out the acceptable forms, failing to
rule out the unacceptable forms, or using more constraints than necessary.

Q.4.2. Out of these three types of rules, only two are known to be needed when describing the phonotactics of human languages. Which type of constraint isn't needed for the Aymara data?

Aymara rules

Official answer:

Q.4.1. *ek, *ok, *uq, *qi, *qu, *[kq], *[qk]

Q.4.2. Type A

Unofficial improved answer, discovered by Blessing Ayenge and Larisha Apete of Haberdashers' Aske's Hatcham College, London:

Q.4.1. *qi, *[au], *[ok], *[uq].

Well done, Blessing and Larisha!