

# 第六届国际理论, 数理及应用语言学奥林匹克竞赛

保加利亚, 阳光海滩, 2008年8月4 — 9日

## 个人赛题目

### 解答规则

1. 毋需抄题. 将不同问题的解答分述于不同的答题纸上. 每张纸上注明题号、座位号和姓名. 否则答题纸可能被误放或遗失.
2. 解答需详细论证. 无解释之答案, 即便完全正确, 也会被处以低分.

题 #1 (20 分). 下面是以被称为李斯图古吉的拼写法拼写地米克马克语的单词, 它们的语音转写及汉语翻译:

1	<i>tmi'gn</i>	dəmiɡən	斧头
2	<i>an'stawteg</i>	anəstawtek	不安全
3	<i>gġiansale'wit</i>	əkciənsalēwit	天使长
4	<i>mgumie'jo'tlatl</i>	əmkumiējōdələdəl	钉蹄铁 (给马)
5	<i>amqwanġi'j</i>	amx <sup>w</sup> ancīc	匙
6	<i>e'jnt</i>	ējənt	印第安代理人
7	<i>tplutaqan</i>	ətpələdaɣan	法律
8	<i>ge'gwisinġ</i>	gēg <sup>w</sup> isink	躺在顶部
9	<i>lnu'sgw</i>	lənuːsk <sup>w</sup>	印第安女人
10	<i>g'p'ta'q</i>	gəbədəx	上方
11	<i>epsaqtejġ</i>	epsaxteck	炉

(a) 转写这些词:

12	<i>gsnqo'qon</i>	愚蠢 (名词)
13	<i>tg'poq</i>	泉水
14	<i>gmū'jmin</i>	树莓
15	<i>emtoqwatġ</i>	崇拜
16	<i>te'plj</i>	山羊

(b) 用 Listuguj 拼写法拼写:

17	ətpədəsən	南方
18	əmteskəm	蛇
19	alaptək	环顾四周
20	gəlamen	所以, 因此

**NB:** 米克马克语是一种阿尔冈昆语. 在加拿大, 约有8000人使用该语言.

In the 转写  $\text{ə} \approx \text{o}$  in *abbot*,  $[\text{c}] = \text{ch}$  in *church*,  $[\text{j}] = \text{j}$  in *judge*,  $[\text{x}] = \text{ch}$  in Scottish *loch*,  $\gamma$  is the same sound but voiced;  $[\text{w}]$  shows that the preceding consonant is pronounced with rounded lips. 标记  $\text{ˉ}$  表示长元音.

—Bozhidar Bozhanov

题 #2 (20 分). 下面是古诺尔斯语诗歌的四个片段, 编写于公元九百年前后. 它们均遵循韵律 *dróttkvætt* (字面意义 ‘宫廷韵律’):

- |  |   |
|--|---|
| <p><b>I</b></p> <p>1 ók at ísarnleiki<br/>2 Jarðar sunr, en dunði ...</p> <p><b>II</b></p> <p>1 þekkiligr með þegnum<br/>2 þrymseilar hval deila.<br/>3 en af breiðu bjóði<br/>4 bragðvís at þat lagði<br/>5 ósvífrandi ása<br/>6 upp þjórhluði fjóra.</p> | <p><b>III</b></p> <p>1 áðr gnapsólar Gripnis<br/>2 gnýstørandi fœri<br/>3 rausnarsamr til rimmu<br/>4 ríðviggs lagar skíðum.</p> <p><b>IV</b></p> <p>1 háði gramr, þars gnúðu,<br/>2 geira hregg við seggi,<br/>3 (rauð fnýsti ben blóði)<br/>4 bryngögl í dyn Sköglar,<br/>5 þás á rausn fyr ræsi<br/>6 (réð egglituðr) seggir ...</p> |
|--|---|

*dróttkvætt* 的一个主要规则是头韵. 每个押韵对句 (行对) 的第一行包含两个单词, 首音相同, 且第二行的第一个单词亦是由此音开头: 如 *rausnarsamr*, *rimmu* 和 *ríðviggs* (III:3–4). 元音被认为与另一个元音或 *j* 合头韵: 如 *ók*, *ísarnleiki* 和 *Jarðar* (I:1–2). 但这不是唯一的规则.

不止一份上述文本的手抄本传承下来. 有时候在文本相同的地方出现了不同的单词, 学者需判断哪种变体为原文. 不同的考虑可能影响结论. 有时候诗律规则有助于确定某些错误变体. 比如, 在行 I:2 中我们不仅仅发现 *dunði*, 也发现了 *dulði* 和 *djarfi*. *dulði* 可以根据诗的结构排除, 但 *dunði* 和 *djarfi* 都可接受, 因此人们需要其他理由来选择单词. 在行 III:1 中, *Gripnis* 和 *Grímnis* 均出现在手抄本中, 但 #3 并不满足诗的要求.

(a) Describe the rules which are observed in a distich of *dróttkvætt*.

\*\*\*

(b) Given is a stanza in which 13 words are omitted:

- V**
- 1  a  (þreifsk reiddra øxa  
2  b  ; knóttu spjór  c  )  
3  d  bitu seggi  
4  e  þjóðkonungs ferðar,  
5 þás (  f  hólða)  
6  g  h  i   
7 (hór vas  j  of  k  )  
8  l  (flugbeiddra  m  ).

The following list contains (in alphabetical order) all 13 omitted words and two words which do not belong in stanza V:

andskoti, Gauta, glymjá, hlaut,  
hugfyltra, hœgra, ríks, rymr,  
sigr, smíði, svartskyggð, sverð,  
svírum, sǫngr, vigra

Fill in the gaps in stanza V.

**NB:** 古诺尔斯语是一种北日耳曼语, 在公元七百年至一千一百年左右使用.

æ ≈ English *a* in *cat*, œ = French *eu* or German *ö* (these letters stand for long vowels). ø is read as a short æ; y = French *u* or German *ü*, ø is an open *o*. **au** 和 **ei** are pronounced as a single syllable. **ð** 和 **þ** = English *th* in *this* and *thin* respectively. **x** = **k**+**s**. 标记 ´ 表示长元音. All samples of poetry in the problem are given in a normalized orthography and conform to the rules of the genre.

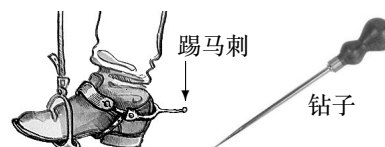
—Alexander Piperski

题 #3 (20 分). The following are words and compounds in two languages of New Caledonia -- 利富语和 Cemuhî -- 和 their English translations given out of order:

利富语	中文
<i>drai-hmitrötr, gaa-hmitrötr, i-drai, i-jun, i-wahnawa, jun, ngöne-gejē, ngöne-uma, nyine-thin, uma-hmitrötr</i>	圣地, bunch of bananas, 日历, 骨头 (单数), 教堂, coast, 钻子, 星期天, skeleton, wall
Cemuhî	中文
<i>a-pulut, ba-bwén, ba-jié, bé-ödu, bé-tii, bé-wöli, bé-wöli-wöta, tii, wöta</i>	bed, 动物, 叉子, cup, pencil, coast, to write, twilight, 踢马刺

And here are several words translated from 利富语 into Cemuhî:

利富语	<i>gaa</i>	<i>ngöne-gejē</i>	<i>nyine</i>	<i>thin</i>
Cemuhî	<i>a</i>	<i>ba-jié</i>	<i>bé</i>	<i>wöli</i>



(a) 找出正确的对应关系.

(b) What do you think the words *wahnawa* 和 *drai* mean in 利富语, and *wöli* 和 *pulut* in Cemuhî?

(c) In 利富语 *tusi* is 'book' and *bii* is '蜜蜂 (单数)'. 翻译 利富语: *i-bii, tusi-hmitrötr*.

NB: 在新喀里多尼亚东部的利富岛上, 超过10 000人在使用利富语. Cemuhî is spoken by approx. 2000 people on the east coast of New Caledonia. Both languages belong to the Austronesian family.

在利富语中  $\tilde{e} \approx a$  in *aspen*,  $\tilde{o} =$  French *eu* or German *ö*, *hm* 和 *hn* are specific unvoiced consonants; *dr* 和 *tr*  $\approx d$  and *t* in *word* and *art*, uttered with the tip of the tongue turned back; *j* 和 *th* = English *th* in *this* and *thin* respectively; *ng* = *ng* in *hang*; *ny*  $\approx ni$  in *onion*.

圣地是教堂的最重要, 神圣的部分.

—Ksenia Gilyarova

题 #4 (20 分). The following are words in Copainalá Zoque 和 their English translations:

<b>mis nakpatpit</b>	with your cactus	<b>k2m2ŋdaPm</b>	shadows
<b>nakpat</b>	a cactus	<b>P2s ncapk2sm2šeh</b>	as if above my sky
<b>mokpittih</b>	only with the corn	<b>capšeh</b>	like a sky
<b>pokskuky2sm2taPm</b>	above the chairs	<b>pahsungotoya</b>	for the squash
<b>pokskuy</b>	a chair	<b>pahsunšehtaPmdih</b>	just like squashes
<b>peroltih</b>	only a kettle	<b>t2ckotoyatih</b>	only for the tooth
<b>koc2ktaPm</b>	mountains	<b>kumguky2sm2</b>	above the town
<b>komg2sm2tih</b>	right above the post	<b>kumgukyotoyataPm</b>	for the towns
<b>P2s ŋgom</b>	my post	<b>cakyotoya</b>	for the vine
<b>k2m2ŋbitšeh</b>	as if with the shadow	<b>mis ncay</b>	your vine

(a) 翻译成中文:

**caky2sm2tih**  
**k2m2ŋšeh**  
**P2s mok**  
**mis nd2ctaPm**  
**pahsunbit**  
**perolkotoyašehtaPm**

(b) 翻译成 Copainalá Zoque:

for the chair  
with my kettle  
just like a mountain  
posts  
above the shadows  
your town

NB: The Copainalá Zoque language is of the Mixe-Zoque linguistic family. 在墨西哥南部的恰帕斯州, 约有10 000人使用该语言.

$\mathbf{2} \approx u$  in *but*;  $\mathbf{c} \approx ts$  in *hats* (pronounced as a single consonant),  $\mathbf{nc} \approx nds$  in *hands*,  $\mathbf{\check{s}} = sh$ ,  $\mathbf{\eta} = ng$  in *hang*,  $\mathbf{y} = y$  in *yay!*;  $\mathbf{P}$  is a specific consonant (the so-called glottal 塞音).

—Ivan Derzhanski

题 #5 (20 分). The following are sentences in Inuktitut 和 their English translations:

- |  |              |
|--|--------------|
| 1. <i>Qingmivit takujaatit.</i>                    | 你的狗看见过你.     |
| 2. <i>Inuuhuktuup iluaqhaiji qukiqtanga.</i>       | 这个男孩射了那个医生.  |
| 3. <i>Aanniqtutit.</i>                             | 你伤了你自已.      |
| 4. <i>Iluaqhaijiup aarqijaatit.</i>                | 这个医生治好了你.    |
| 5. <i>Qingmiq iputujait.</i>                       | 你刺了那条狗.      |
| 6. <i>Angatkuq iluaqhaijimik aarqisijug.</i>       | 这个萨满治好了一个医生. |
| 7. <i>Nanuq qaijug.</i>                            | 这只北极熊来过了.    |
| 8. <i>Iluaqhaijivit inuuhuktuit aarqijanga.</i>    | 你的医生治好了你的男孩. |
| 9. <i>Angunahuktiup amaruq iputujanga.</i>         | 这个猎人刺了那匹狼.   |
| 10. <i>Qingmiup ilinniaqtitsijiit aanniqtanga.</i> | 这条狗伤了你的老师.   |
| 11. <i>Ukiakhaqtutit.</i>                          | 你摔倒了.        |
| 12. <i>Angunahukti nanurmik qukiqsijug.</i>        | 这个猎人射了一只北极熊. |

(a) 翻译成中文:

13. *Amaruup angatkuik takujanga.*
14. *Nanuit inuuhukturmik aanniqsijug.*
15. *Angunahuktiit aarqijug.*
16. *Ilinniaqtitsiji qukiqtait.*
17. *Qaijutit.*
18. *Angunahuktimik aarqisijutit.*

(b) 翻译成 Inuktitut:

19. 这个萨满伤了你.
20. 这位老师看到了那个男孩.
21. 你的狼摔倒了.
22. 你射了一条狗.
23. 你的狗伤了一个老师.

**NB:** Inuktitut (Canadian Inuit) belongs to the Eskimo-Aleut family of languages. 在加拿大北部, 约有35 000人使用该语言.

The letter *r* denotes a 'Parisian' *r* (pronounced far back in the mouth), and *q* stands for a *k*-like sound made in the same place.

A shaman is a priest, sorcerer and healer in some cultures.

—Bozhidar Bozhanov

编者: Alexander Berdichevsky, Bozhidar Bozhanov, Svetlana Burlak, Ivan Derzhanski (主编),  
Ludmilla Fedorova, Dmitry Gerasimov, Ksenia Gilyarova, Ivaylo Grozdev, Stanislav Gurevich,  
Adam Hesterberg, Boris Iomdin, Ilya Itkin, Renate Pajusalu, Alexander Piperski, Maria  
Rubinstein, Todor Tchervenkov.

中文文本: 刘闯晨.

祝你好运!

# 第六届国际理论, 数理及应用语言学奥林匹克竞赛

保加利亚, 阳光海滩, 2008年8月4 — 9日

## 个人赛解答

### 题 #1. 规则:

1. The apostrophe indicates length if it follows a vowel, and is read as ə if it follows a consonant.
2. The letter *w* stands for a rounding of the lips after a consonant and for the sound [w] otherwise.
3. ə is pronounced, though not written, between any consonant and a following sonorant consonant ([l m n]).
4. ə is also pronounced before a consonant cluster at the beginning of a word.
5. *p t j g gw q qw* are pronounced as 浊辅音 s (b d j g g<sup>w</sup> γ γ<sup>w</sup>) at the beginning of a word or between vowels and as voiceless consonants (p t c k k<sup>w</sup> x x<sup>w</sup>) at the end of a word or next to another consonant.

### 答案:

(a) 12 əksənɔ̃ʁon, 13 ətkəbox, 14 gəmūjəmin, 15 emtoɣ<sup>w</sup>atk, 16 dəbəlɔ̃c;

(b) 17 *tp'te'sn*, 18 *mtesgm*, 19 *alapt'g*, 20 *glamen*.

### 题 #2. (a) 规则:

1. Number of syllables. Each line contains 6 syllables.
2. 头韵. See the statement of the problem.
3. Internal rhyme. Let us denote the vowels (and diphthongs) in each line by  $V_1, V_2, \dots, V_6$ . At least one consonant immediately following  $V_5$  must immediately follow  $V_n$  ( $n = 1, 2$  或  $3$ ). Also, in even lines  $V_n = V_5$ .

For instance, cf. lines IV, 1–6 (alliteration is marked in boldface, internal rhyme by underlining):

#### IV

- 1 háð**i** gramr, þars **gnúð**u,
- 2 geira hregg við seggi,
- 3 (rauð fnýsti **ben blóð**i)
- 4 bryngog**l** í dyn Skog**l**ar,
- 5 þás á ra**u**sn fyr ræsi
- 6 (réð egglit**uð**r) segg**i**r ...

(b) Leftover words: **hœgra**, **smíði**.

#### V

- 1 <sup>a</sup> **ríks** (þreifsk reiddra ø**x**a
- 2 <sup>b</sup> **rymr** ; knóttu spjór <sup>c</sup> **glymja** )
- 3 <sup>d</sup> **svartskyggð** bitu seggi
- 4 <sup>e</sup> **sverð** þjóðkonungs ferðar,
- 5 þás ( <sup>f</sup> **hugfyl**dra **hólð**a)
- 6 <sup>g</sup> **hlaut** <sup>h</sup> **andskoti** <sup>i</sup> **Gauta**
- 7 (hór vas <sup>j</sup> **söng**r of <sup>k</sup> **sví**rum )
- 8 <sup>l</sup> **sigr** (flugbeiddra <sup>m</sup> **vígra** ).

题 #3. The modifier follows its head in both languages.

(a)	<i>jun</i>	骨头 (单数)	
	<i>i-jun</i>	skeleton	(multitude of 骨头 (复数))
	<i>i-wahnawa</i>	bunch of bananas	(multitude of 香蕉 (复数))
	<i>i-drai</i>	日历	(multitude of days)
	<i>drai-hmitrötr</i>	星期天	(holyday)
	<i>gaa-hmitrötr</i>	圣地	(holypplace)
	<i>uma-hmitrötr</i>	教堂	(holychouse)
	<i>ngöne-uma</i>	wall	(house border)
	<i>ngöne-gejë</i>	coast	(水 border)
	<i>nyine-thin</i>	钻子	(tool to poke)
	<i>tii</i>	to write	
	<i>bé-tii</i>	pencil	(tool to write)
	<i>bé-wöli</i>	叉子	(tool to poke)
	<i>wöta</i>	动物	
	<i>bé-wöli-wöta</i>	踢马刺	(tool to poke animal)
	<i>bé-ödu</i>	cup	(tool 饮用 (动词))
	<i>ba-jié</i>	coast	(水 border)
	<i>ba-bwén</i>	twilight	(night border)
	<i>a-pulut</i>	bed	(place to sleep)

(b) *wahnawa* ‘香蕉 (单数)’, *drai* ‘day’; *wöli* ‘to poke’, *pulut* ‘睡觉 (动词)’.

(c) *i-bii* ‘swarm of bees (multitude of 蜜蜂 (复数))’, *tusi-hmitrötr* ‘Bible (holybook)’.

题 #4. The noun suffixes seen in this problem are:

1. **-k2sm2** ‘上方’, **-kotoya** ‘for’, **-pit** ‘with’;
2. **-šeh** ‘like, as if’;
3. **-taPm** plural;
4. **-tih** ‘only (just, right)’.

After a nasal consonant (**m**, **n**, **ŋ**) the 塞音 **s**, **p**, **t**, **k** become voiced (**b**, **d**, **g** respectively). If **k** comes after **y**, the two sounds exchange places.

The possessive pronouns are **P2s** ‘my’ and **mis** ‘your’; if the noun begins with a 塞音, this consonant becomes voiced and the corresponding nasal appears before it.

(a)	<b>caky2sm2tih</b>	rightabove the vine
	<b>k2m2ŋšeh</b>	likea shadow
	<b>P2s mok</b>	my corn
	<b>mis nd2ctaPm</b>	your teeth
	<b>pahsunbit</b>	with the squash
	<b>perolkotoyašehtaPm</b>	as iffor the kettles

(b)	for the chair	<b>pokskukyotoya</b>
	with my kettle	<b>P2s mberolpit</b>
	justlikea mountain	<b>koc2kšehtih</b>
	posts	<b>komdaPm</b>
	above the shadows	<b>k2m2ŋg2sm2taPm</b>
	your town	<b>mis ŋgumguy</b>

题 #5. The Inuktitut sentences have the following general structure:

X-(q)	V--		'X V (himself).'
X-(q) Y-(r)mik	V-si--		'X V a Y.'
X-up Y-(q)	V--		'X V the Y.'

where X 和 Y are nouns and V is the verb. If a noun gets the ending **-q** when it is either a definite object or a subject of a sentence that doesn't have a definite object, it also gets **-r** before the ending **-mik** when it is an indefinite object (*nanu-q* — *nanu-r-mik*; *iluaqhaiji* — *iluaqhaiji-mik*). To say 'your', **-(q)** is replaced by **-it**, **-up** by **-vit**.

The verb receives the following suffixes:

- **-j** following a vowel or **-t** following a consonant;
- an ending for the persons of the subject and the definite object, if there is one:
  - in the first two schemata: **-u-tit** '2', **-u-q** '3';
  - in the third schema: **-a-it** '2/3', **-a-nga** '3/3', **-a-atit** '3/2'.

一个没有宾语的及物动词当作反身动词处理.

- (a)
13. 这匹狼看见过你的萨满.
  14. 你的北极熊伤害了一个男孩.
  15. 你的猎人治好了他自己.
  16. 你射了这个老师.
  17. 你来过了.
  18. 你治好了一个猎人.
- (b)
19. *Angatkuup aanniqtaatit.*
  20. *Ilinniaqtitsijiup inuuhuktuq takujanga.*
  21. *Amaruit ukiakhaqtuq.*
  22. *Qingmirmik qukiqsijutit.*
  23. *Qingmiit ilinniaqtitsijimik aannijsijuq.*

# 第六届国际理论, 数理及应用语言学奥林匹克竞赛

保加利亚, 阳光海滩, 2008年8月4 — 9日

## 团体赛题目

在编译广韵字典时 (1007--1011), 汉语相当同质化. 由于汉字不是表音文字, 该字典使用了一套简单的系统, 通过两个汉字来表示一个汉字的发音, 而读者理应知道前者的发音 (它们是常用字). 这套系统叫做反切.

后来, 虽然汉语方言分化, 但许多古代的反切转写仍可使用, 只不过在不同的方言中有不同 (且更复杂) 的使用方法.

下面是一些反切转写. 每个汉字的广东话读音亦给出.

汉字	=	转写
1. 倦 kyn <sup>2</sup>	= 渠 k <sup>h</sup> œy <sup>21</sup>	* 卷 kyn <sup>3</sup>
2. 求 k <sup>h</sup> au <sup>21</sup>	= 巨 kœy <sup>2</sup>	* 鳩 kau <sup>53</sup>
3. 住 cy <sup>2</sup>	= 持 c <sup>h</sup> i <sup>21</sup>	* 遇 y <sup>2</sup>
4. 病 piŋ <sup>2</sup>	= 皮 p <sup>h</sup> ei <sup>21</sup>	* 命 miŋ <sup>2</sup>
5. 掉 tiu <sup>2</sup>	= 徒 t <sup>h</sup> ou <sup>21</sup>	* 弔 tiu <sup>3</sup>
6. 鳩 kau <sup>53</sup>	= 居 kœy <sup>53</sup>	* 求 k <sup>h</sup> au <sup>21</sup>
7. 僖 hei <sup>53</sup>	= 許 hœy <sup>35</sup>	* 其 k <sup>h</sup> ei <sup>21</sup>
8. 朗 loŋ <sup>13</sup>	= 盧 lou <sup>21</sup>	* 黨 toŋ <sup>35</sup>
9. 韶 siu <sup>21</sup>	= 市 si <sup>13</sup>	* 昭 ciu <sup>53</sup>
10. 帳 cœŋ <sup>3</sup>	= 知 ci <sup>3</sup>	* 亮 lœŋ <sup>2</sup>
11. 欸 c <sup>h</sup> iu <sup>35</sup>	= 親 c <sup>h</sup> an <sup>3</sup>	* 小 siu <sup>35</sup>
12. 舞 mou <sup>13</sup>	= 文 man <sup>2</sup>	* 甫 p <sup>h</sup> ou <sup>35</sup>
13. 謏 siu <sup>35</sup>	= 先 sin <sup>53</sup>	* 烏 niu <sup>13</sup>
14. 臼 k <sup>h</sup> au <sup>13</sup>	= 其 k <sup>h</sup> ei <sup>21</sup>	* 九 kau <sup>35</sup>
15. 斜 c <sup>h</sup> e <sup>21</sup>	= 似 c <sup>h</sup> i <sup>13</sup>	* 嗟 ce <sup>53</sup>
16. 葍 kau <sup>3</sup>	= 古 ku <sup>35</sup>	* 候 hau <sup>2</sup>

(a) 解释古代反切转写是如何应用于现代广东话的.

(b) 在编译广韵时反切转写是如何工作的? 在广东话中, 上述转写只有一个可以应用这条简单的老规则来得到正确的结果. 哪一个呢?

在多数当代汉语方言中 (包括广东话和普通话) 不存在浊辅音, 除了响音 (l, m, n, ŋ). 在广韵编译时汉语存在其他浊辅音, 它们后来并成对应的清音: 浊擦音变成清擦音 (如 z > s), 浊塞音变成送气或不送气清塞音 (如 d > t 或 t<sup>h</sup>). 浊音在吴语中得到了保留. 比如, 汉字 徒 在吴语中发作 [du<sup>21</sup>], 在广东话中发作 [t<sup>h</sup>ou<sup>21</sup>], 在普通话中发作 [t<sup>h</sup>u<sup>35</sup>].

(c) 上一节中的哪些汉字在编译广韵时首辅音为浊辅音? 这些浊辅音在广东话中变得送气或者不送气取决于什么条件?

(d) 在古汉语中存在四种声调, 但是只有三种出现在此题中. 解释这三种音调是如何演变出广东话的六种音调.

下面是另外一些转写, 但只给出了其普通话读音:



17. 遭  $\text{can}^5$  = 張  $\text{can}^5$  \* 連  $\text{lian}^{35}$   
 18. 良  $\text{lian}^{35}$  = 呂  $\text{ly}^{214}$  \* 章  $\text{can}^5$   
 19. 遵  $\text{cun}^5$  = 將  $\text{kian}^{51}$  \* 倫  $\text{lun}^{35}$   
 20. 蕭  $\text{xiao}^5$  = 蘇  $\text{su}^5$  \* 彫  $\text{tiao}^5$   
 21. 嵌  $\text{k}^h\text{ian}^5$  = 口  $\text{k}^h\text{ou}^{214}$  \* 銜  $\text{xian}^{35}$   
 22. 先  $\text{xian}^5$  = 蘇  $\text{su}^5$  \* 前  $\text{k}^h\text{ian}^{35}$   
 23. 嶼  $\text{c}^h\text{an}^{35}$  = 鋤  $\text{c}^h\text{u}^{35}$  \* 銜  $\text{k}^h\text{ian}^{35}$   
 24. 婞  $\text{xin}^{51}$  = 胡  $\text{xu}^{35}$  \* 頂  $\text{tin}^{214}$   
 25. 弗  $\text{c}^h\text{an}^{214}$  = 初  $\text{c}^h\text{u}^5$  \* 限  $\text{xian}^{51}$   
 26. 趯  $\text{c}^h\text{uei}^{214}$  = 千  $\text{k}^h\text{ian}^5$  \* 水  $\text{c}^h\text{uei}^{214}$   
 27. 初  $\text{c}^h\text{u}^5$  = 楚  $\text{c}^h\text{u}^{214}$  \* 居  $\text{ky}^5$   
 28. 釧  $\text{c}^h\text{uan}^{51}$  = 尺  $\text{c}^h^{214}$  \* 絹  $\text{kyan}^{51}$   
 29. 卷  $\text{kyan}^{214}$  = 居  $\text{ky}^5$  \* 轉  $\text{cuan}^{214}$   
 30. 處  $\text{c}^h\text{u}^{51}$  = 昌  $\text{c}^h\text{an}^5$  \* 據  $\text{ky}^{51}$   
 31. 俦  $\text{p}^h\text{in}^5$  = 普  $\text{p}^h\text{u}^{214}$  \* 丁  $\text{tin}^5$   
 32. 蚪  $\text{tou}^{214}$  = 當  $\text{tan}^5$  \* 口  $\text{k}^h\text{ou}^{214}$

(e) 暂时忽略音调, 给出在普通话中使用古代反切转写的规则.

下面是些汉字及其广东话和普通话的读音:

	广东话	普通话		广东话	普通话
33. 唐	$\text{t}^h\text{ou}^{21}$	$\text{t}^h\text{an}^{35}$	40. 采	$\text{pin}^2$	$\text{pian}^{51}$
34. 謨	$\text{mou}^{21}$	$\text{mo}^{35}$	41. 帝	$\text{tai}^3$	$\text{ti}^{51}$
35. 踐	$\text{c}^h\text{in}^{13}$	$\text{kian}^{51}$	42. 透	$\text{t}^h\text{au}^3$	$\text{t}^h\text{ou}^{51}$
36. 少	$\text{siu}^{35}$	$\text{c}^h\text{ao}^{214}$	43. 被	$\text{p}^h\text{ei}^{13}$	$\text{pei}^{51}$
37. 夔	$\text{k}^h\text{wai}^{21}$	$\text{k}^h\text{uei}^{35}$	44. 囂	$\text{hiu}^{53}$	$\text{xiao}^5$
38. 你	$\text{nei}^{13}$	$\text{ni}^{214}$	45. 粉	$\text{fan}^{21}$	$\text{fen}^{35}$
39. 暫	$\text{caam}^2$	$\text{can}^{51}$			

(f) 描述音调和浊首辅音是如何在普通话中演变的. 可以总结出哪些在普通话中读反切转写的音调的规则?

(g) 一些初始的辅音和音调组合在现代普通话中极为罕见. 哪些呢?

下面是另外一些汉字及其广东话和普通话的读音. 一些音调被移除:

	广东话	普通话		广东话	普通话
46. 置	$\text{t}^h\text{u}^{35}$	$\text{t}^h\text{u}^{35}$	49. 眠	$\text{min}^{21}$	$\text{mian}^{35}$
47. 載	$\text{coi}^3$	$\text{cai}^{35}$	50. 蛸	$\text{siu}^{35}$	$\text{xiao}^5$
48. 米	$\text{mai}^{35}$	$\text{mi}^{214}$	51. 亂	$\text{lyn}^{35}$	$\text{luan}^{51}$

(h) 判断出遗失的音调是哪些.

(i) 给出下面的转写在广东话中的读法:

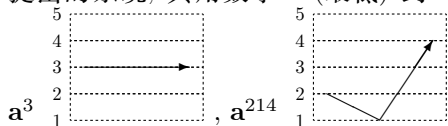
52. 梯 ? = 土  $\text{t}^h\text{ou}^{35}$  \* 雞  $\text{kai}^{53}$   
 53. 嘯 ? = 蘇  $\text{sou}^{53}$  \* 弔  $\text{tiu}^3$   
 54. 浪 ? = 魯  $\text{lou}^{13}$  \* 當  $\text{ton}^{53}$   
 55. 憊 ? = 蒲  $\text{p}^h\text{ou}^{21}$  \* 拜  $\text{pai}^3$

(j) 给出下面的转写在普通话中的读法. 一些转写本不可读, 但这道题包含了足以读出它们的信息:

- |                                      |                             |
|--------------------------------------|-----------------------------|
| 56. 賽 ? = 先 $\acute{x}ian^5=13A=22X$ | ★ 代 $tai^{51}$              |
| 57. 簡 ? = 古 $ku^{214}=16A$           | ★ 限 $\acute{x}ian^{51}=25B$ |
| 58. 賞 ? = 書 $\acute{s}u^5$           | ★ 兩 $lianj^{214}$           |
| 59. 俗 ? = 普 $p^hu^{214}=31A$         | ★ 乃 $nai^{214}$             |
| 60. 洫 ? = 胡 $xu^{35}=24A$            | ★ 畎 $k^hyan^{214}$          |
| 61. 犬 ? = 苦 $k^hu^{214}$             | ★ 洫 = 60X                   |
| 62. 下 ? = 胡 $xu^{35}=24A$            | ★ 駕 $kia^{51}$              |
| 63. 捍 ? = 下 = 62X                    | ★ 赧 $nan^{214}$             |
| 64. 紂 ? = 除 $\acute{c}^hu^{35}$      | ★ 柳 $liou^{214}$            |
| 65. 囊 ? = 奴 $nu^{35}$                | ★ 當 $tanj^5=32A=54B$        |
| 66. 鰓 ? = 蘇 $su^5=20A=22A=53A$       | ★ 來 $lai^{35}$              |

**NB:** 普通话是中国的官方语言, 基于北京方言. 约八亿五千万人使用该语言. 九千万人使用吴语 (上海话), 七千万人使用广东话 (粤语).

每个汉语方言都有固定数目的音调 (每个音节发音的旋律). 本题使用了语言学家赵元任提出的系统, 其用数字 1 (最低) 到 5 (最高) 来标记音高的五级, 并将音调转写成连续的音级:



. 你所需的全部音调都在本题中出现了.

标记  $^h$  indicates that the preceding 塞音 consonant is aspirated (pronounced with a puff of air).  $x = ch$  in Scottish *loch*,  $\eta = ng$  in *hang*.  $c \approx ts$  in *hats* (pronounced as a single consonant),  $\acute{s}$  and  $\acute{c}$  are hard consonants similar to English *sh* in *shut* and *ch* in *chuck*,  $\acute{x}$  and  $\acute{k}$  are soft consonants similar to *sh* in *sheet* and *ch* in *cheat*.  $\acute{o}$  和  $\acute{y}$  = French *eu* and *u* (German *ö* and *ü*).

如果你不想写汉字, 你可以使用转写的序号并指明具体的汉字来指代它们: X (被转写的), A (第一个用于转写的汉字) 或 B (第二个用于转写的汉字).

注意普通话的 28A 汉字的读法不包含元音.

—Todor Tchervenkov

中文文本: 刘闽晟.

祝你好运!

# 第六届国际理论, 数理及应用语言学奥林匹克竞赛

保加利亚, 阳光海滩, 2008年8月4 — 9日

## 团体赛解答

汉语音节由三部分组成: 声母 (首辅音, 可能不存在如 3B), 韵母 (后面的所有音) 和声调. 广东话音调可以认为存在两种不同的性质: 音高 (高或低) 和轮廓 (升, 平或降).

	升	平	降
高	35	3	53
低	13	2	21

- (a) 若要在广东话中使用反切转写, A 的声母和声调音高将于 B 的韵母及声调轮廓组合. But if A's (and X's) tone is 低, X's onset, if a 塞音, must always be 送气 if B's (and X's) tone is 升 (13) 或降 (21), and un 送气 if it is 平 (2).

- (b) Certainly the onset was from the A character, and the rhyme from B. But the aspiration rule is strange. Probably it was not part of the original fanqie system. Maybe the tone came from only one of the two characters? That has to be B, because the old rule should give correct results in only one 转写.

Thus the original simple rule for fanqie was: A's onset is combined with B's rhyme and tone. Only 转写 11 can be read now using this rule.

- (c) Looking at the syllables with a sonorant onset, we see that they are always in a low tone (13, 2 或 21). Assuming that all 浊辅音 s evolved alike in Cantonese, we may conclude that what is in a low tone now, had a voiced onset earlier. This is also true of the character of the example from Wu. What is said in (d) supports this idea.

Thus the characters whose onsets were voiced are: 1X 和 1A, 2X (=6B) 和 2A, 3X 和 3A, 3B (if it had an onset at all), 4X 和 4A, 5X 和 5A, 7B (=14A), 9X 和 9A, 14X, 15X 和 15A, 16B.

Voiced 塞音 s became 送气 if the tone was 升或降, and un 送气 if it was 平.

- (d) The contours of the Cantonese tones correspond to the three tones of Classical Chinese; tone height is an innovation brought about by the evolution of the 浊辅音 s.

因此我们可以解释为什么反切转写在广东话中这样读. The X character has the same tone height as A because it got its onset from A, and height in Cantonese is determined by the voicing of the onset in Classical Chinese. But if the onset was a voiced 塞音, it could evolve in different ways in X and A, because its aspiration was determined by the tone contour, which X got from B, and it could differ from A's contour.

- (e) In Mandarin onsets and rhymes are not combined in such a straightforward way as in Cantonese. It can be noted that after  $\acute{x}$  ( $k$ ,  $k^h$ ) we always find  $i$  或  $y$ , whereas  $x$  ( $k$ ,  $k^h$ ),  $s$  ( $c$ ,  $c^h$ ) 和  $\acute{s}$  ( $\zeta$ ,  $\zeta^h$ ) are never followed by these vowels.

We already know that the onset came from A and the rhyme from B. When the constraint above came into being,

- $i$  was lost and  $y$  became  $u$  after  $\acute{s}$  ( $\zeta$ ,  $\zeta^h$ );
- $x$  ( $k$ ,  $k^h$ ) 和  $s$  ( $c$ ,  $c^h$ ) became  $\acute{x}$  ( $k$ ,  $k^h$ ) before  $i$  或  $y$ .

在普通话中使用反切转写同样需要应用如上规则. However,

- if A's onset is  $\acute{x}$  ( $k$ ,  $k^h$ ) and B's rhyme starts with neither  $i$  nor  $y$ , we can't determine what X's onset is;
- if B's onset is  $\acute{s}$  ( $\zeta$ ,  $\zeta^h$ ) and A's onset is none of these, we can't determine what X's rhyme is.

(f) On the basis of the tone of the Cantonese syllable we can determine whether the onset was voiced or not in Classical Chinese. In Mandarin the tones developed as follows:

- 升: 51 if the onset was voiced but not a sonorant, 214 otherwise;
- 平: 51 (always);
- 降: 5 if the onset was voiceless, 35 otherwise.

We see that the contour is not preserved here. Voiced 塞音  $s$  became 送气 if the tone was 降, and un 送气 if it was 平或升.

In 反切转写  $s$  read 在普通话中 the tones work as follows:

	5, 35	214	(F, H $-$ ) <sup>51</sup>	(H $+$ , L) <sup>51</sup>
5	5	214	214, 51	51
L <sup>35</sup>	35	214	214, 51	51
(F, H $+$ ) <sup>35</sup>	35	51	51	51
L <sup>214</sup>	35	214	214, 51	51
(F, H $\pm$ ) <sup>214</sup>	5	214	214, 51	51
L <sup>51</sup>	35	214	214, 51	51
H $+$ <sup>51</sup>	5	214	214, 51	51
(F, H $-$ ) <sup>51</sup>	5, 35	214, 51	214, 51	51

Here L stands for a sonorant, F for a 擦音, H $-$  for an un 送气 and H $+$  for an 送气 塞音. Thus most of the time X's tone in Mandarin can't be derived unambiguously from A's and B's tones, though in some cases it can.

(g) Syllables with a sonorant onset and tone 5 or with an un 送气 onset and tone 35 should not exist in Mandarin (if they do, then the rules must have had exceptions).

(h) 46: **21**, 47: **51**, 48: **13**, 49: **35**, 50: **53**, 51: **2**.

(i) 52  $t^h ai^{53}$ , 53  $siu^3$ , 54  $lo\eta^2$ , 55  $paai^2$ .

(j) 56  $sai^{51}$ , 57  $kian^{214}$ , 58  $\acute{s}a\eta^{214}$ , 59  $p^h ai^{214}$ , 60  $\acute{x}yan^{51}$ , 61  $k^h yan^{214}$ , 62  $\acute{x}ia^{51}$ , 63  $xan^{51}$ , 64  $\acute{c}ou^{51}$ , 65  $na\eta^{35}$ , 66  $sai^5$ .