HKOI Introduction Talk

2018

Hong Kong Olympiad in Informatics

- Annual software competition for secondary school students
- Organized by Hong Kong Association of Computer Education and Education Bureau, HKSAR Government
- Co-organized by Department of Computer Science and Engineering, The Chinese University of Hong Kong

Aims of HKOI

- Select potential candidates for international competitions
- International Competitions
  - IOI (International Olympiad in Informatics)
  - NOI (China National Olympiad in Informatics)
  - APIO (Asia-Pacific Informatics Olympiad)

About us

Executive Committee

Oa Yang Hau Chung, HKACE (Yan Oi Tong Tin Ka Ping Secondary School)
Cheung Chung Kin, HKACE (Lok Sin Tong Ku Chiu Man Secondary School)
Yu Chi Wing, HKACE
Lai Lok Tin, HKACE (Shun Tak Fraternal Association Leung Kau Kui College)
Hui Chun Kit, HKACE (Carmel Secondary School)
Tang Kam Hon (Ying Wa Girls' School)
Technology Education Section, Curriculum Development Institute, Education Bureau, HKSARG
Chan Siu On, Assistant Professor, Department of Computer Science and Engineering, CUHK
Li Minming, Associate Professor, Department of Computer Science, CityU
Wong Tsz Chun, Head, HKOI Training Team
Wong Man Hang, Advisor
Lau Chi Yung, Advisor

Competition Committee

Tung Kam Chuen (Head)
Ho Ngan Hang
Li Cheuk Man
Poon Lik Hang
Wong Man Hang
Wong Tsz Chun
Wong Yik Chun
Yik Wai Pan

Training Committee

Ho Ngan Hang (Head)
Chan Wai Chi
Chow Kwan Ting Jeremy
Li Cheuk Man
Poon Lik Hang
Tung Kam Chuen
Wong Yik Chun
Yik Wai Pan

Online Materials and Server Committee

Wong Tsz Chun (Head)
Chan Wai Chi
Chow Kwan Ting Jeremy
Lau Chi Yung
Leung Man Ho
Wong Man Hang
Yik Wai Pan

Contents of HKOI

- Write console applications
- Solve problems within the specified time and memory limit
- Emphasize on problem solving techniques and programming skills

Benefits of Participating in HKOI

- Improve your problem solving skills
- Prizes
- Chances to represent Hong Kong in international competitions
- Make new friends

Heat

- **90 minutes written test**

Top 90 contestants of each group

Final

- **3 hrs practical test**

Medalist (Top half of each group)

Training

- **January to June, 2019**
- **Weekly on Saturdays**

Team Formation Test

International Competition

- **IOI/NOI 2019: July – August, 2019**
- **APIO 2019: May, 2019**

Heat Event

- All students will be admitted
- List of participating school list will be posted on HKOI website

Heat Event

- 90 minutes written test
- Consisting of multiple-choice questions and short questions
- Bring : Student ID/ HKID, basic stationeries, HB pencils
- No calculators, electronic devices, notes, textbooks…
- At most top 90 students from each group advance to final

Heat Event Structure

- Junior :
  - 5 True or False Questions (@1 mark)
  - 20 Multiple Choice Questions (@1 mark)
  - 8 – 12 Fill in the blanks (Variable)
- Senior:
  - 20 – 25 Multiple Choice Questions (@1 mark)
  - 8 – 12 Fill in the blanks (Variable)
- No marks will be deducted for wrong answer

Sample Questions (True or False)

- The ASCII code of 'A' is smaller than that of 'a'.

- The random seek time of a solid state drive (SSD) is slower than that of a traditional magnetic disk drive.

- It takes the same time to execute each line of code in a program.

Sample Questions (Multiple Choice)

Dry Run

Pascal 版本

```
var
  i, j: longint;
  tri: array[0..14, 0..14] of
       longint;
begin
  for i := 0 to 14 do
    for j := 0 to 14 do
      tri[i][j] := 0;
  tri[0][0] := 1;
  for i := 1 to 14 do
  begin
    tri[i][0] := 1;
    tri[i][i] := 1;
    for j := 1 to i - 1 do
      tri[i][j] := tri[i - 1][j]
        + tri[i - 1][j + 1]
  end;
  write(tri[7][1], ' ',
    tri[13][7])
end.
```

C 版本

```
int tri[15][15], i, j;
int main() {
  for (i = 0; i <= 14; i++)
    for (j = 0; j <= 14; j++)
      tri[i][j] = 0;
  tri[0][0] = 1;
  for (i = 1; i <= 14; i++) {
    tri[i][0] = 1;
    tri[i][i] = 1;
    for (j = 1; j <= i - 1; j++)
      tri[i][j] = tri[i - 1][j]
        + tri[i - 1][j + 1];
  }
  printf("%d %d", tri[7][1],
    tri[13][7]);
  return 0;
}
```

C++ 版本

```
int tri[15][15], i, j;
int main() {
  for (i = 0; i <= 14; i++)
    for (j = 0; j <= 14; j++)
      tri[i][j] = 0;
  tri[0][0] = 1;
  for (i = 1; i <= 14; i++) {
    tri[i][0] = 1;
    tri[i][i] = 1;
    for (j = 1; j <= i - 1; j++)
      tri[i][j] = tri[i - 1][j]
        + tri[i - 1][j + 1];
  }
  cout << tri[7][1] << " "
    << tri[13][7];
  return 0;
}
```

11. 第一個輸出的數是？

A. 7
B. 13
C. 21
D. 1716

Sample Questions (Multiple Choice)

- For C and C++, some includes would be omitted

- C
  - #include <stdio.h>
  - #include <string.h>
  - #include <math.h>
  - #include <stdlib.h>

- C++
  - #include <iostream>
  - #include <string>
  - #include <cstdio>
  - #include <cmath>
  - #include <cstdlib>
  - using namespace std;

Sample Questions (Multiple Choice)

Mathematics

6. Palindromes are strings that read the same forward or reversed. For example, "abcba" is a palindrome while "accda" isn't.

Substring of a string is any continuous segment of the string, For example, Both "a", "b", "c", "ab", "bc" and "abc" are substrings of "abc", while "ac" isn't.

How many strings of length exactly 4 does not consist of any substring that is palindrome and with length larger than 1? Consider characters from "a" to "z" only.

For example, "abcd" is one of the strings that match the condition, while "aabc" is not. (Since "aa" is a palindrome).

A. 374400
B. 390000
C. 405600
D. 422500

Sample Questions (Multiple Choice)

Exhaustion

9. We have a 4 x 4 chessboard. A white or black chess must be placed in each cell. Two cells which share a common edge are considered as neighbors.

Every chess must have an odd number of neighboring chess of the same color. For example, the following is a valid configuration.

```
oxxx
ooxo
oxoo
xxxo
```

In how many valid ways can you fill the following chessboard? ("x"、"o"、"." represent black chess, white chess and a cell to be filled respectively)

```
x.oo
....
....
....
```

A. 1
B. 2
C. 8
D. 16

Sample Questions (Multiple Choice)

Logic

14. For integers a, b, c and d, it is given that:

$a > b$

$d < b$

$b < c$

Which of the following relation(s) can be deduced?

i. $a > c$

ii. $a < c$

iii. $c > d$

iv. $d < a$

A. i and iv only

B. iii and iv only

C. iii only

D. ii, iii and iv only

Sample Questions (Multiple Choice)

Data structures

2. What is/are the difference(s) between a sorted array and a sorted linked list?

   i. Binary Search can be performed on a sorted array, but not a sorted linked list.

   ii. Generally it takes more time to delete an element from the middle of a sorted array than a sorted linked list.

   iii. Given that you know all elements before storing it, it needs more memory for an array than a linked list.

A. i only
B. i and ii
C. ii and iii
D. All of above

Sample Questions (Multiple Choice)

Graphs

11. There are many people in a party. Some pairs of people are friends. Their relationship is interesting. If A and B are friends, and B and C are friends, then A and C would be friends too. You are given the following information about the people in the party:

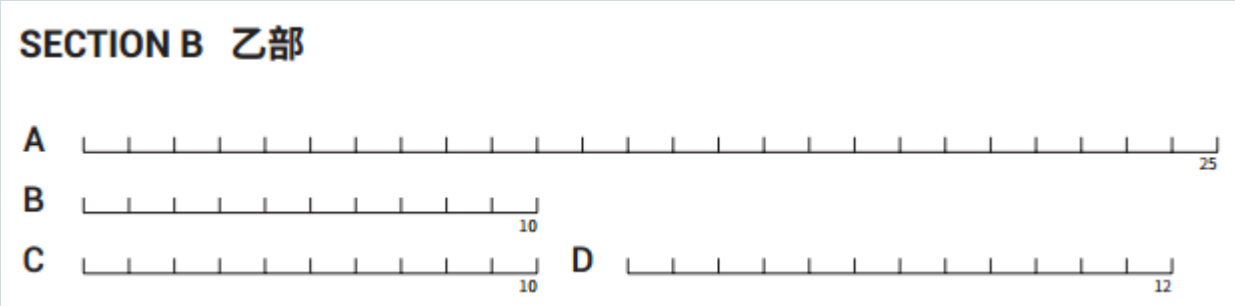
    Tryndamere and Taric are friends.
    Master Yi and Wukong are friends.
    Xin Zhao and Jarvan IV are friends.
    Lee Sin and Garen are friends.
    Taric and Xin Zhao are friends.

At least how many pairs of friends are there?

A. 5
B. 6
C. 7
D. 8

Sample Questions (Fill in the Blanks)

➢No marks will be given if length of answer is greater than the designated number of boxes



➢For C and C++, the functions from those omitted includes can be directly used

Final Event

- Duration : 3 Hours
- Number of Questions : 4

Final Event Structure

- Write solutions (complete and compliable programs) on computer
- Pascal (FreePascal 3.0.0), C or C++11 (Dev-C++ 5.11)
- The program should be able to :
  - Input data from standard input (keyboard)
  - Solve the problem within limited time and memory
  - Output the answer to standard output (screen) strictly followed the format specified in the problem

Example

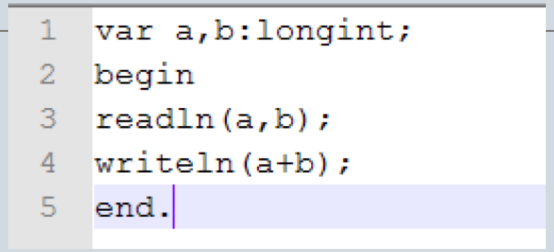
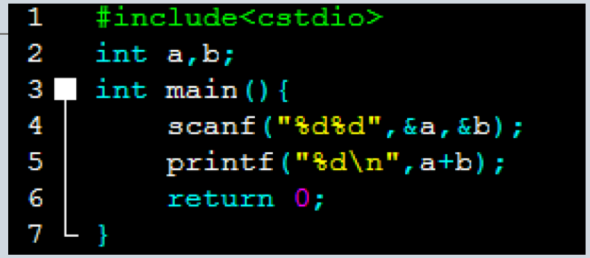
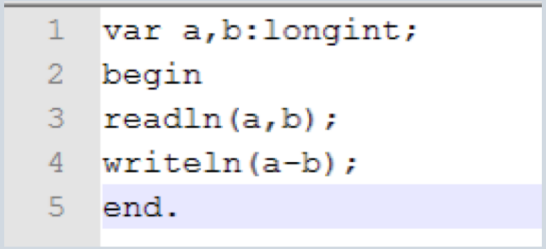
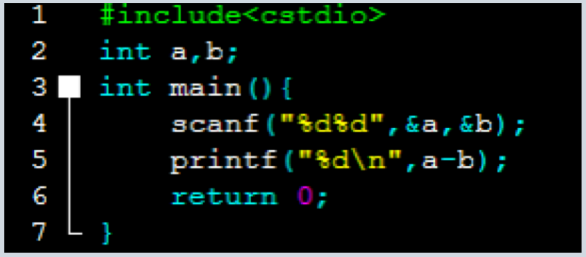
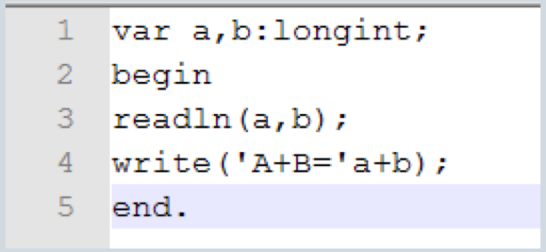
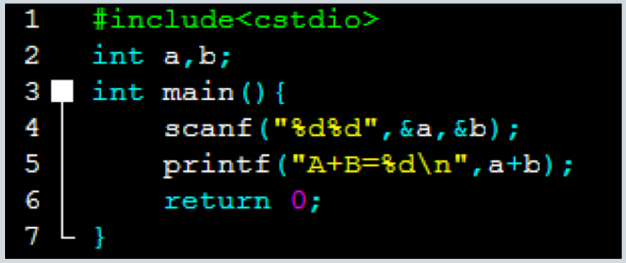
Problem : Given two integers a and b. Calculate a + b.

Input : Two integers a, b ($0 \leq a, b \leq 1,000,000$) separated by a single space.

Output : The sum of a and b.

Sample Input :
5 10

Sample Output :
15

	Pascal version:	C++ version:
Correct solution (100%):		
Incorrect solution (0%): (Wrong Answer)		
Incorrect solution (0%): (Wrong Format)		

Final Event Structure

- Required techniques:
  - Mathematics
  - Control structures
  - String processing
  - Array processing
  - Errors and debugging
  - Data structures

Awards

- Only the performances in the Final Event count towards awards
- At most half of all finalists in the group receive a medal
- The ratio of gold, silver and bronze medals is about 1:2:3
- The minimum score for a Gold medal is the highest score such that at least one twelfth of all finalists in the group receive a gold medal
- The minimum score for a Silver medal is the highest score such that at least one quarter of all finalists in the group receive a gold or silver medal
- The minimum score for a Bronze medal is the lowest score such that at most one half of all finalists in the group receive a medal.

Awards

- Best Young Contestant Award
  - The highest-scoring Junior Group finalist who is in F.3 or below
- Best First-Time Contestant Award
  - The highest-scoring finalist who applied to participate for the first time in each group
- Eligible contestants who tie for the same highest score will all be awarded

Awards

- Each Gold, Silver and Bronze medalist will be awarded 5, 2 and 1 point(s) respectively
- The sum of points for all medalists in a school will constitute the school score (excluding those nominated by the HKACE)
- The three schools with the highest school scores will be awarded Grand School Prizes

Tips and Preparation

- Do
  - Read the questions carefully
  - Watch out for tricks
  - Try fill-in-the-blanks, some of them are easy (Heat)
  - Score points for as many subtasks as possible (Final)
- Do not
  - Leave blanks
  - Stick with a single question for too long
  - Make presumptions for the problems
  - Exceed the provided spaces for fill-in-the-blanks (Heat)
  - Be obsessed by full solutions (Final)

Tips and Preparation

- Past papers (http://hkoi.org/en/past-problems/)
- Ask HKOI trainers for guidance
- Practice environment – HKOI Online Judge

Q&A Session

香港電腦奧林匹克競賽 HKOI
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已讚好 · 訊息 · 儲存 · 更多 · 傳送訊息

- 主頁
- **關於**
- 相片
- 評價
- 讚好分析
- 影片
- 帖子

建立專頁

關於香港電腦奧林匹克競賽 HKOI

編輯建議

概覽

專頁資訊

專頁資訊

地址	HKACE, 00000 Tseung Kwan O, Hong Kong
開始日期	創立於 1997年
簡短說明	HKOI 2016/17 Introduction Talk簡介會: 23 September 2016 Official website: hkoi.org
詳細說明	Hong Kong Olympiad in Informatics (HKOI) is an annual programming competition for secondary students in Hong Kong. 香港電腦奧林匹克競賽 (Hong Kong Olympiad in Informatics，簡稱HKOI) 是一年一度的電腦軟件設計比賽。
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