



The CENTRE for EDUCATION
in MATHEMATICS and COMPUTING

Faculty of Mathematics
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1

2001 Canadian Computing Competition Results

Sponsors:



take it to the nth

Before addressing the individual questions, it is appropriate to thank the many teachers who gave of their time to assist their students in participating in the competition, and for their time and effort in performing the initial grading of their students' programs. In order to allow the largest number of languages to be used in stage one, we must rely on assistance from our colleagues in the schools.

Problem J1 - Dressing Up

This problem was well done and could be easily coded using a couple of loops with counters.

Problem J2 - Mod Inverse

Determining if a mod inverse exists is an exercise in integer (or modular) arithmetic and can be done with a simple test loop.

Problem J3S1 - Keeping Score

The solution to this problem consists of initializing a values table for the counting cards and five totals, one for each suit and then one for the overall total.

Problem J4S2 - Spirals

Several approaches present themselves here. Two of them are: constructing an array along with routines to print the appropriate portions, and actually calculating the contents of the rows and printing them directly.

Problem J5S3 - Strategic Bombing

This question is really just finding the cut-edges of a graph which place vertices A and B in separate components of the graph. Solutions require the ability to find all simple paths between A and B in the graph, and then determine which single edges destroy all the paths upon their removal.

Problem S4 - Cookies

The problem was to find the diameter of the smallest circle which would contain every point in a given set. There are several approaches, but most require the finding of the circumcentre of a triangle. This is the point of intersection of the perpendicular bisectors of the sides. Several people incorrectly accepted the midpoint of (0, 0) to (5, 10) in the 4th test case as the centre of the circle. This gives a diameter of 11.18 but such a circle could not contain the vertices (0, 0), (5, 10) and (10, 0) at the same time. This illustrates that taking the maximum distance between two chips does not insure that the circle with that diameter will capture all the chips.

Problem S5 - Posts's Correspondence Problem

This can be a very difficult problem to program efficiently, but there are some properties which can short-cut the search when no solution exists. If no strings in A begin with the same letter as any string in B, there can be no solution. Also if all the strings in A or B are shorter than all the strings in the other set, then there is no solution.

One approach is to select a beginning string from each set and build onto the shorter string using the next character in the longer string as a start point. For example if $a_1 = abc$ and $b_1 = ab$, the next string from B must start with a c .

Group 4 - Scores from 44 to 49

Herman	Au	Richmond Hill H.S.	Richmond Hill, ON
Yasir	Bilal	W.F. Herman S.S.	Windsor, ON
Corey	Brookes	Hugh Mcroberts S.S.	Richmond, BC
Tessa	Chaworth	Crofton House School	Vancouver, BC
Matthew	Cheung	Markville S.S.	Markham, ON
Peter	Colijn	Western Canada H.S.	Calgary, AB
Jason	Cote	Polyvalente De Levis	Levis, QC
Barry	Dowsett	St. Benedict C.S.S.	Cambridge, ON
Gerard	Escalante	Moscrop J.S.S.	Burnaby, BC
Allie	Henze	Crofton House School	Vancouver, BC
Joel	Jackson	Western Canada H.S.	Calgary, AB
Tyler	Krug Wilson	Holy Cross C.S.S.	Kingston, ON
Erica	Lai	Crofton House School	Vancouver, BC
Patrick	Lam	Thornhill S.S.	Thornhill, ON
Jeff	Lindquist	Markham D.H.S.	Markham, ON
Kyle	Martens	John F. Ross CVI	Guelph, ON
Amitava	Mukhopadhyia	Vincent Massey S.S.	Windsor, ON
Xitij	Patel	Gordon Graydon Memorial S.S.	Mississauga, ON
Brock	Pehar	St. Thomas Aquinas S.S.	Oakville, ON
David	Schacter	Bialik H.S.	Cote St. Luc, QC
Andrew	Scherkus	Oakville Trafalgar H.S.	Oakville, ON
Philippe	St Pierre	Cecep De La Gaspésie	Gaspé, QC
Matthew	Stephan	Thornhill S.S.	Thornhill, ON
Anna	Tiounina	Sir Sandford Fleming Academy	North York, ON
Peter	Todd	Woburn Collegiate Institute	Toronto, ON
Lily	Tung	Crofton House School	Vancouver, BC
Anandh	Venkateswar	Markville S.S.	Markham, ON
Paul	Walker	F.E. Madill S.S.	Wingham, ON
Carl	Wong	Western Canada H.S.	Calgary, AB
Jimmy	Wong	Hugh McRoberts S.S.	Richmond, BC
Vincent	Woo	Brother Andre C.H.S.	Markham, ON

Senior Competitors

Students are listed in alphabetical order within each group / Dans chaque groupe, les élèves sont nommés en ordre alphabétiques.

Name Nom	School École	Location Endroit
Gold Medallists		
John	Admanski	Waterloo C.I.
Marcin	Mika	Father Michael Goetz S.S.
Thomas	Ootjers	East Northumberland S.S.
William	Slofstra	Elmira D.S.S.
Xin	Zhang	Woburn Collegiate Institute
Silver Medallists		
Frank P. M.	Chu	Killarney S.S.
Blake	Dickie	George Elliot S.S.
Michael	Huang	Woburn Collegiate Institute
Roger	Mong	Don Mills C.I.
Liviu	Tancau	Don Mills C.I.
Bronze Medallists		
Saul	Bancroft	Thornhill S.S.
Paul	Bechard	Kingston C.V.I.
Sergei	Taguer	Earl Of March S.S.
Raymond	Tsang	St. Francis Xavier C.H.S.
Pau L.	Turner	Kingston C.V.I.
Alex	Xiang	Glenforest S.S.

Name Nom	School École	Location Endroit
Honourable Mention		
Mohammed	Ajmal	Woburn Collegiate Institute
Graeme D.	Baer	Toronto French School
John	Carbrey	Thornlea S.S.
Wojciech	Hlibowicki	Sir Oliver Mowat C.I.
Justin	Lee	St. Michael's College School
Chris	Lo	Philip Pocock C.S.S.
James	Martens	Danforth Coll. & Tech. Inst.
Sean	Mcintosh	Gordon Graydon Memorial S.S.
Aly	Merchant	Woburn Collegiate Institute
Sanjay	Patel	Univ. Of Toronto Schools
Peter	Quinsey	Vincent Massey S.S.
Igor	Rehak	Richview C.I.
Chris	Stephenson	Forest Heights C.I.
Markus	Svilans	Holy Trinity C.H.S.
Ali	Tavakoli	Agincourt C.I.
Daniel	Urquhart	J. Lloyd Crowe S.S.
Anthony	Xu	Woburn Collegiate Institute
Scores from 42 - 48		
Adnan	Ali	Agincourt C.I.
James	Barlow	Mount Douglas S.S.
Wissam	Bishara	Vincent Massey S.S.
Karl	Blass	Vincent Massey S.S.
Andrei	Borac	Home School
Dan H.	Burken	Sir Robert Borden H.S.
Jeffrey	Chadwick	St. Thomas Aquinas S.S.
Johnathon	Christie	Cardinal Carter S.S.
Bryan	Eyler	Beaver Brae S.S.
Bruce	Fontaine	London Central S.S.
Robert	Henry	Markville S.S.
David	Herzog	Cameron Heights C.I.
Sahand	Hormoz	Thornlea S.S.
Saeed	Jahed	Clarkson S.S.
Robert	Kitts	St. Matthew H.S.
Spencer	Lai	Streetsville S.S.
Eugene	Lam	Brother Andre C.H.S.
Talent	Lam	Markville S.S.
Luke	Lichty	Orillia D.C.&V.S.
Peter	Lloyd	Woburn Collegiate Institute
Avery	Miller	Sir Robert Borden H.S.
Vlad	Mnih	Father John Redmond H.S.
Andrew	Mo	Woburn Collegiate Institute
Bryce	Moore	Eastdale C.V.I.
Derek	Mulder	St. John's-Ravenscourt School
Sharvil	Nanavati	Hillfield-Strathallan College
Stefan	Pintilie	Crescent School
Andrew	Roth	Colonel By S.S.
Patrick	Rutledge	Westminster S.S.
Adin	Scannell	Georgetown D.H.S.
Arjuna	Sivasithamb	Woburn Collegiate Institute
William	Somers	Gloucester H.S.
Cezary	Swieton	Waterloo C.I.
Douglas	Thomas	Gloucester H.S.
Feng	Tian	Vincent Massey S.S.
Brian	Wodlinger	Thornlea S.S.
David	Wong	Woburn Collegiate Institute
Henry	Wong	St. Francis Xavier C.H.S.
Andrew	Woolsey	Westminster S.S.
Johnny	Yip	Markham D.H.S.
Peter	Yu	Markham D.H.S.
Scores from 41 - 35		
Antoine	Atallah	Champlain Regional College
Brandon	Aubie	St. Mary's H.S.
Arash	Behravan	Don Mills C.I.

Canadian Student Honour Roll

Palmarès des élèves à l'échelle nationale

Jason Alexander	Bond Bradley	Huron Park S.S.	Woodstock, ON
Jeffrey Carlos	Cassidy Castillo	Vancouver College H.S.	Vancouver, BC
Ronald Daly	Chan Chang	Hillfield-Strathallan College	Hamilton, ON
Brian Chris	Choi Chui	Lambrick Park S.S.	Victoria, BC
Keith Mike	Chung Darmitz	Markville S.S.	Markham, ON
Vladan Chris	Djeric Donaldson	Erindale S.S.	Mississauga, ON
Chris Matt	Eagar Elliott	Markville S.S.	Markham, ON
Lloyd Alan	Ellis Esaagoolian	St. Andrew's College	Aurora, ON
James James	Grisdale Harris	Western Canada H.S.	Calgary, AB
Jeff Tyler	Hause Hesse	Erindale S.S.	Mississauga, ON
Ha Ns Kenneth	Ho Hogg	Forest Heights C.I.	Kitchener, ON
Brian Jeremy	Hughes Ilton	Thomas A. Stewart S.S.	Peterborough, ON
Mark Paul	Istoan Koo Tze Mew	London Central S.S.	London, ON
Warren Jon	Langmaid Larochelle	Kingston C.V.I.	Kingston, ON
Benoit Linus	Lee Lee	Thornlea S.S.	Thornhill, ON
Shawn Victor	Leipnik Lenart	Huron Park S.S.	Woodstock, ON
Adam Jason	Lloyd Price Lung	Centennial C. & V.I.	Guelph, ON
Jonathan Gavin	Macdonald Mackie	St. David C.S.S.	Waterloo, ON
Brent W.J. Eamon	Mcdermott Mcfadyen	Kenner C.V.I.	Peterborough, ON
Chris Rodney	Milligan Myklebust	Don Mills C.I.	Don Mills, ON
Tor Serguei	Narajnyi Navrozally	M.M. Robinson H.S.	Burlington, ON
Ali Samuel	Ng O Reilly	Woburn Collegiate Institute	Toronto, ON
Joseph Conor	Ohara Pasala	St. Thomas Aquinas S.S.	London, ON
Nihar David	Payne Pong	Waterloo C.I.	Waterloo, ON
David Gary	Riley Robertson	Philip Pocock C.S.S.	Mississauga, ON
Reed Matthew	Rodriguez Rowe	Markham D.H.S.	Markham, ON
Antonio Sarah	Schofield Sewell	Champlain Regional College	St. Lambert, QC
Sarah James	Skinner Song	St. John's-Ravenscourt School	Winnipeg, MB
David Sarah	Stolle Stumpf	Gloucester H.S.	Gloucester, ON
Zhen Yu Jonathan	Timmermans Tomas	St. Mary's H.S.	Kitchener, ON
Jonathan Jason	Tong Walker	Loyola C.S.S.	Mississauga, ON
Jason Lakan	Wong Wong	Western Canada H.S.	Calgary, AB
Lakan Kuo Bao	Wong Wong	Univ. Of Toronto Schools	Toronto, ON
Robert Albert	Wong Wong	Brother Andre C.H.S.	Markham, ON
Alexander Alfred Y. F.	Wood Xu	Monsignor Doyle C.S.S.	Cambridge, ON
David Jason		Bracebridge-Muskoka Lakes S.S.	Bracebridge, ON
Jason Patrick		M.M. Robinson H.S.	Burlington, ON
Kevin		Markville S.S.	Markham, ON
		Logan H.S.	Logan, USA
		Glenforest S.S.	Mississauga, ON
		Markville S.S.	Markham, ON
		Markham D.H.S.	Markham, ON
		Holy Cross C.S.S.	Kingston, ON
		St. Thomas Aquinas S.S.	Oakville, ON
		Woburn Collegiate Institute	Toronto, ON
		South Delta S.S.	Delta, BC
		Agincourt C.I.	Agincourt, ON
		Richmond Hill H.S.	Richmond Hill, ON
		Chatham-Kent S.S.	Chatham, ON
		St. David C.S.S.	Waterloo, ON
		St. Matthew H.S.	Orleans, ON
		St. Matthew H.S.	Orleans, ON
		Georgetown D.H.S.	Georgetown, ON
		Holy Cross C.S.S.	Kingston, ON
		Centennial C. & V.I.	Guelph, ON
		St. Mary's C.S.S.	Hamilton, ON
		Mount Douglas S.S.	Victoria, BC
		St. Thomas Aquinas S.S.	London, ON
		Brother Andre C.H.S.	Markham, ON
		Richview C.I.	Etobicoke, ON
		Richview C.I.	Etobicoke, ON
		St. Joseph S.S.	Mississauga, ON
		Agincourt C.I.	Agincourt, ON
		Thornhill S.S.	Thornhill, ON
		Markville S.S.	Markham, ON
		Agincourt C.I.	Agincourt, ON
		Cardinal Carter C.H.S.	Aurora, ON
		Waterloo C.I.	Waterloo, ON

Problem Averages

Moyenne par problèmes

Problem	Junior (all)	Junior (non-zero)	Senior (all)	Senior (non-zero)
J1	11.4	12.6	----	----
J2	10.6	12.4	----	----
S1J3	8.4	11.7	11.0	12.5
S2J4	5.5	10.3	8.7	11.6
S3J5	0.1	1.0	1.3	4.6
S4	----	----	4.4	8.5
S5	----	----	1.3	6.5

The averages denoted (all) in the above table include all students in the division.

The averages denoted (non-zero) in the above table include only students in the division who achieved a non-zero score on the problem.

There were 730 Senior Division competitors and 418 Junior Division Competitors.

Student Rankings

Classement des élèves

Junior Competitors

Senior Competitors

Rank/ Position	Score/ Note	Rank/ Position	Score/ Note	Rank/ Position	Score/ Note	Rank/ Position	Score/ Note	Rank/ Position	Score/ Note	Rank/ Position	Score/ Note
1	70	120	41	265	20	1	75	57	44	364	21
2	61	124	40	270	19	2	73	60	43	385	20
5	60	127	39	273	18	3	72	63	42	402	19
12	59	137	38	278	17	5	71	75	41	405	18
17	58	144	37	282	16	7	70	84	40	422	17
24	57	149	36	285	15	8	68	98	39	430	16
30	56	154	35	320	14	9	64	109	38	437	15
36	55	160	34	327	13	11	63	119	37	485	14
41	54	163	33	331	12	13	60	132	36	510	13
46	53	166	32	341	11	16	59	140	35	545	12
47	52	169	31	346	10	17	58	146	34	577	11
51	51	174	30	352	9	18	57	159	33	588	10
55	50	204	29	364	8	20	56	176	32	604	9
58	49	208	28	365	7	22	55	182	31	614	8
62	48	218	27	370	6	24	54	191	30	618	7
66	47	227	26	377	5	26	53	219	29	625	6
68	46	234	25	384	4	27	52	239	28	635	5
70	45	238	24	386	3	29	51	270	27	644	4
82	44	250	23	391	2	31	50	302	26	648	3
89	43	252	22	394	1	34	48	315	25	656	2
112	42	256	21	395	0	41	47	333	24	660	1
						47	46	344	23	662	0
						51	45	354	22		

2001 Canadian Computing Competition Committee

Jim Bowman
Waterloo Collegiate Institute

Gord Cormack (Chair)
Computer Science Department
University of Waterloo

Graeme Kemkes
University of Waterloo

Rich Clausi
Elmira District Secondary School

Barry Ferguson
University of Waterloo

Ian Munro
Computer Science Department
University of Waterloo

Donny Cheung
University of Waterloo

Sandy Graham
University of Waterloo

Troy Vasiga
University of Waterloo

