

**Ryerson University**  
**Department of Computer Science**  
**CPS125 - Winter 2016**  
**Midterm Test - Section IX (Programming)**

Family Name: \_\_\_\_\_ Given Name: \_\_\_\_\_

Student #: \_\_\_\_\_ Section number: \_\_\_\_\_

Your Ryerson email: \_\_\_\_\_@ryerson.ca

Please circle your professor's name

Carvalho	Davoudpour	Derpanis	Hamelin	Hiraki
Kokkarinen	Panar	Soutchanski	<u>Tirandazian</u>	

Important Notes:

- This section must be written in pen.
- For all questions requiring reading from a file, you must use the file input protocol (fopen/fscanf/fclose).
- You must use scalar variables only. Use of arrays is forbidden.



FOR OFFICE USE ONLY

1 to 20	21	22	TOTAL
/10	/5	/5	/20

**Do not open the test until instructed**

Professors and invigilators will not answer any questions during the test  
(except if you need help understanding an English word)

Question 21 (5 marks):

A file named "numbers.dat" contains 20 integer numbers (no duplicates, all the numbers are different). Write a complete C program that prints out the two smallest numbers.

Professors and invigilators will not answer any questions during the test  
(except if you need help understanding an English word)



Question 22 (5 marks):

Gosper's formula is used to calculate an approximation of the factorial of a number.

$$n! = n^n e^{-n} \sqrt{(2n+1/3)\pi}$$

Write a complete C program that prompts the user to enter a positive integer number  $n$  (you must write an input validation loop to require a positive value), uses Gosper's formula to approximate  $n!$ , and then displays the result with three decimals precision.

Note that the values of  $e$  and  $\pi$  are predefined in `math.h` as constant macros `M_E` and `M_PI`.

*End of programming section.*

*Don't forget to do the multiple choice part.*

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