

PLEASE HAND IN

UNIVERSITY OF TORONTO  
FACULTY OF ARTS AND SCIENCE

MIDTERM #1

CSC 104H1

DURATION — 50 MINUTES

NO AIDS ALLOWED

PLEASE HAND IN

STUDENT NUMBER:

LAST NAME:

FIRST NAME:

*Do NOT turn this page until you have received the signal to start.*  
(In the meantime, please fill out the identification section above,  
and read the instructions below.)

This test consists of 4 questions on 6 pages (including this one). *When you receive the signal to start, please make sure that your copy of the test is complete.*

Please answer questions in the space provided. You will earn 20% for any question you leave blank or write "I cannot answer this question," on. You will earn substantial part marks for writing down the outline of a solution and indicating which steps are missing.

Write your student number at the bottom of pages 2-6 of this test.

# 1: \_\_\_\_\_/ 8

# 2: \_\_\_\_\_/10

# 3: \_\_\_\_\_/10

# 4: \_\_\_\_\_/ 5

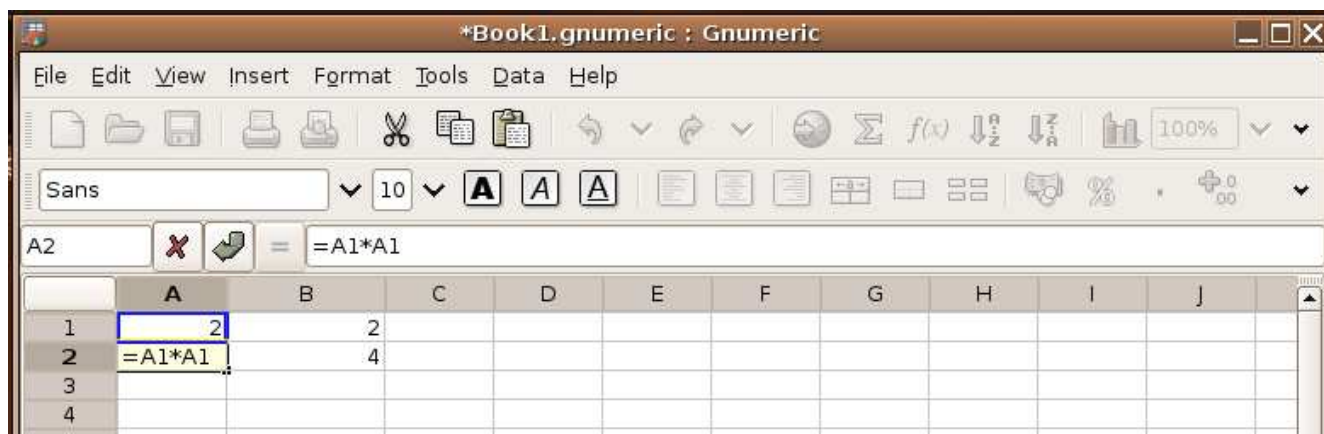
TOTAL: \_\_\_\_\_/33

*Good Luck!*

## QUESTION 1. [8 MARKS]

## PART (A) [4 MARKS]

Look at the fragment of a numeric spreadsheet below. Notice that cell A2 contains the formula  $= A1 * A1$ . Suppose you copy the formula in A2 to A3 and A4 (using the mouse to drag the lower right corner down, or using Ctrl-C Ctrl-V). Answer the questions below:



1. What number will appear in cell A2?

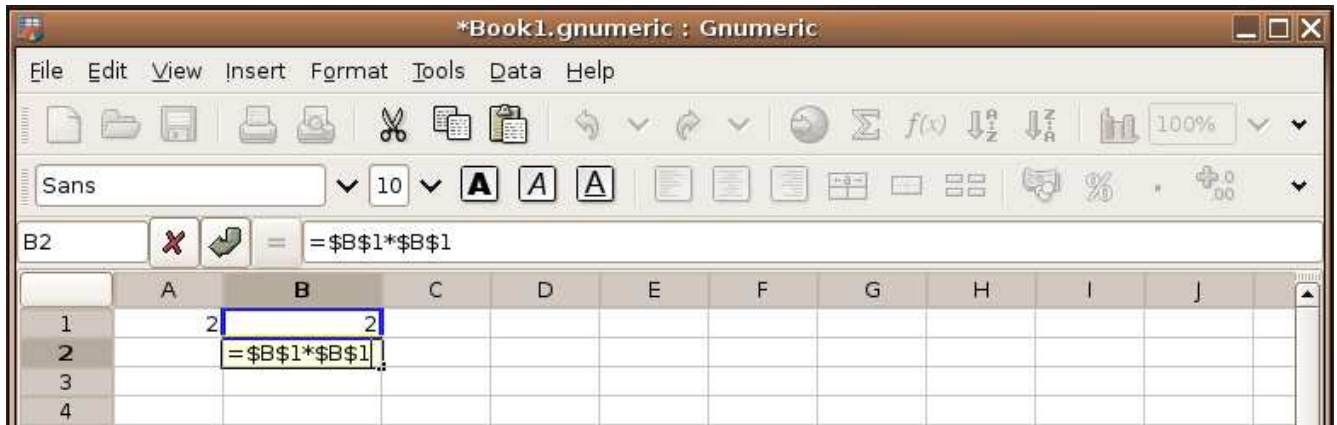
2. What number will appear in cell A3?

3. What number will appear in cell A4?

4. Explain why the formulas produce these numbers.

## PART (B) [4 MARKS]

Look at the fragment of a gnumeric spreadsheet below. Notice that the cell  $B2$  contains the formula  $= \$B\$1 * \$B\$1$ . Suppose you copy the formula in  $B2$  to both  $B3$  and  $B4$  (using the mouse to drag the lower right corner down, or using Ctrl-C Ctrl-V). Answer the questions below:



1. What number will appear in cell  $B2$ ?

2. What number will appear in cell  $B3$ ?

3. What number will appear in cell  $B4$ ?

4. Explain why the formulas produce these numbers.

## QUESTION 2. [10 MARKS]

## PART (A) [2 MARKS]

What base ten number does the binary number 001010111 represent?

## PART (B) [2 MARKS]

How do you write the base ten number 41 as a binary number?

## PART (C) [4 MARKS]

Add 001010111 to 41 written as a binary number. Show your work. What is the result, in base 10? (You are welcome to use up to 9-bit numbers).

## PART (D) [2 MARKS]

Find the 8-digit binary number that, when added to 10010111, produces 8 zeroes (no need to worry about the carry from the left-most addition).

QUESTION 3. [10 MARKS]

Examine the fragment of a gnumeric spreadsheet below. Calculate the missing values of  $37n^2 + 7n + 3$  for  $n = 2, 3, 4, 5, 6, 7, 8, 9, 10$ . Your calculations may use the entries from the spreadsheet and the addition operation (no multiplication). Show your work, which will resemble an exercise you did in tutorial.

|    | A  | B                | C        | D        | E | F | G | H | I | J |
|----|----|------------------|----------|----------|---|---|---|---|---|---|
| 1  | n  | $37n^2 + 7n + 3$ | 1st diff | 2nd diff |   |   |   |   |   |   |
| 2  | 0  | 3                | 44       | 74       |   |   |   |   |   |   |
| 3  | 1  | 47               | 118      | 74       |   |   |   |   |   |   |
| 4  | 2  |                  |          | 74       |   |   |   |   |   |   |
| 5  | 3  |                  |          | 74       |   |   |   |   |   |   |
| 6  | 4  |                  |          | 74       |   |   |   |   |   |   |
| 7  | 5  |                  |          | 74       |   |   |   |   |   |   |
| 8  | 6  |                  |          | 74       |   |   |   |   |   |   |
| 9  | 7  |                  |          | 74       |   |   |   |   |   |   |
| 10 | 8  |                  |          | 74       |   |   |   |   |   |   |
| 11 | 9  |                  |          | 74       |   |   |   |   |   |   |
| 12 | 10 |                  |          |          |   |   |   |   |   |   |
| 13 |    |                  |          |          |   |   |   |   |   |   |

## QUESTION 4. [5 MARKS]

## PART (A) [2 MARKS]

Suppose you typed three English words into the Google search engine, with the aim of getting as few hits as possible. What principles would guide your choice of the three words?

## PART (B) [3 MARKS]

What sort of web pages would you expect Google's search to turn up, even though you apply the principles described in the previous part?

Total Marks = 33

Student #: \_\_\_\_\_

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END OF EXAM