

PLEASE HAND IN

UNIVERSITY OF TORONTO  
FACULTY OF ARTS AND SCIENCE

TERM TEST #2

CSC 104H

DURATION — 50 MINUTES

PLEASE HAND IN

LAST/FAMILY NAME: \_\_\_\_\_

FIRST/GIVEN 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.)

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This test consists of 3 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.

*Good Luck!*

**QUESTION 1.** [9 MARKS]**PART (A)** [3 MARKS]

Convert 54 to its binary representation, BRIEFLY showing the steps of your procedure.

**PART (B)** [3 MARKS]

Convert the binary representation 1010011 to its decimal representation, BRIEFLY showing the steps of your procedure.

**PART (C)** [3 MARKS]

Add the numbers whose binary representations are 11010 and 11011 (without converting them to decimal notation). Show your work (i.e. when you “carry” a 1).

## QUESTION 2. [14 MARKS]

NOTE: For this question you DO NOT have to show the colors, just draw the shapes.  
Assume the following have been defined:

```
(define pond (ellipse 20 10 "solid" "blue"))

(define tree (above (triangle 20 "solid" "green")
                    (square 10 "solid" "brown")))

(define house (above (triangle 20 "solid" "black")
                     (square 20 "outline" "black")))

(define empty-space (square 10 "solid" (make-color 0 0 0 0)))

(define h-list (list house))
```

## PART (A) [3 MARKS]

Show the result value of each of the following expressions:

pond

tree

house

## PART (B) [5 MARKS]

Show the result value of each of the following expressions:

(length (list))

(length h-list)

(rest h-list)

(first h-list)

(length (rest h-list))

Assume the following has been defined:

```
(define (street a-list)
  (cond [(= (length a-list) 0) empty-space]
        [else (beside
                (street (rest a-list))
                (first a-list)
                (street (rest a-list)))]))
```

PART (C) [2 MARKS]

Show the result value of the following expression:

```
(street h-list)
```

PART (D) [2 MARKS]

Show the result value of the following expression:

```
(street (list tree house))
```

PART (E) [2 MARKS]

Show the result value of the following expression, briefly showing your steps:

```
(street (list pond tree house))
```

## QUESTION 3. [10 MARKS]

## PART (A) [4 MARKS]

Here are four check-expects for a function f:

(check-expect (f 0) ▲)

(check-expect (f 1) ◀)

(check-expect (f 2) ◻▼)

(check-expect (f 3) ◻▶)

Complete the following two incomplete check-expects WITHOUT drawing any images manually by hand. Instead, use (f 0) in your check-expect for (f 1), and use (f 2) in your check-expect for (f 3).

(check-expect (f 1)

(check-expect (f 3)

## PART (B) [4 MARKS]

Assume that the following definition is also in the Definitions pane:

(define T ▲)

Write the function f, including the contract.

; f :                   ->

PART (C) [2 MARKS]

Show the result value of the following expression:

(f 4)

# 1: \_\_\_\_\_/ 9

# 2: \_\_\_\_\_/14

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

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