# CPSC 359 Final Exam Question 1

Name: Ayman Shahriar

UCID: 10180260

**a) Determine the input and output variables, and assigning letter symbols to the variables:**

There are three input variables:
- **z**: the "ones"
- **y**: the "twos"
- **x**: the "fours"

There are three output variables:
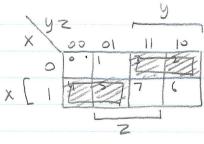- **A**: the "ones"
- **B**: the "twos"
- **C**: the "fours"

b) Create a truth table

| x | y | z | A | B | C |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 | 1 |

c) Find the simplified functions of each output using the map
· method:

Find the simplified function of A:

$A = xy' + x'y$



Find the simplified function of B:

$B = y'$

Find the simplified function of C:

$$C = z$$

|  x \ yz | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | 0 | 1 | 3 | 2 |
| 1 | 4 | 5 | 7 | 6 |

(K-map with y across top, z at bottom, x on left)

d) Draw the logic diagram that implements the functions



x
y'
x'
y

→ A

y' ————————————— B

z ————————————— C

e) The design has been implemented in the Logisim file question1.circ