UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF ENGINEERING

SCHOOL OF COMPUTING

SESSION 2020/2021 SEMESTER 2

SCSJ3203 THEORY OF COMPUTER SCIENCE
SECTION 04

TUTORIAL 1
SET OPERATIONS

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TCS : Tutorial 1. (Set Operations)

1. $U = \{0, 1, 2, 3, 4, 5, 6, 7\}$
   $X = \{2, 3, 4\}$
   $Y = \{1, 4, 5\}$
   $Z = \{2, 5, 7\}$

   a) $(X \cup Y)' = \{0, 6, 7\}$

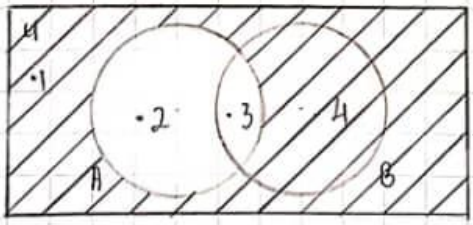
   b) $X' \cup Y' = \{0, 6, 7\}$

   c) $X \cup (Y \cap Z) = \{2, 3, 4, 5\}$

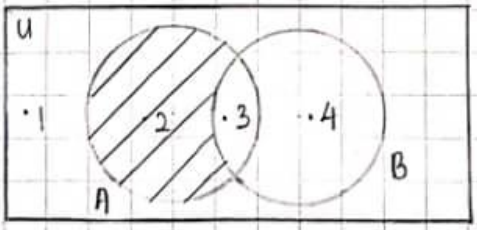
   d) $(X \cup Y) \cap Z = \{1, 2, 3, 4, 5, 7\}$

2. $U = \{1, 2, 3, 4\}$
   $A = \{2, 3\}$
   $B = \{3, 4\}$

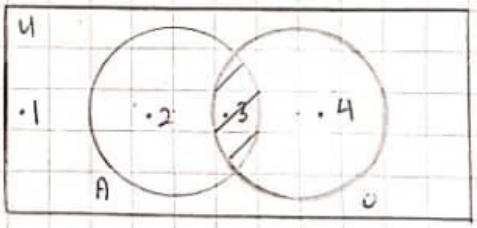
   a) $A' = \{1, 4\}$



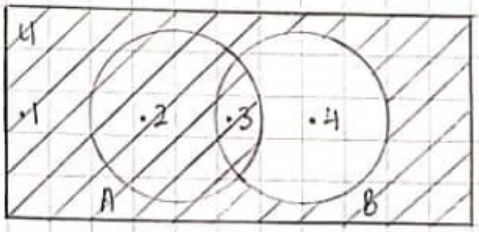
   b) $(A \cap B)' = \{2\}$



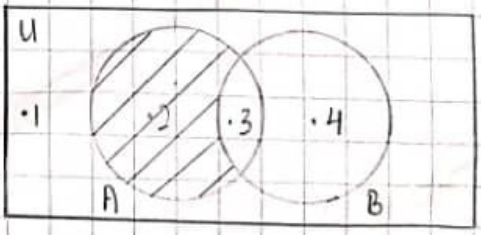
   c) $A - (B') = \{3\}$



   d) $A \cup B' = \{1, 2, 5\}$



   e) $A \cap B' = \{2\}$



3. $X = \{a, b, c\}$
$Y = \{1, 2\}$

a) List all the subsets of X

$X = \{\{\emptyset\}, \{a\}, \{b\}, \{c\}, \{a, b\}, \{b, c\}, \{a, c\}, \{a, b, c\}\}$

b) List all the members of $X \times Y$

$X \times Y = \{a, b, c\} \times \{1, 2\}$

$= \{(a, 1), (a, 2), (b, 1), (b, 2), (c1, c2)\}$

4. a) $\{a, b\{a, b\}, \{\{a, b\}\}\} - \{a, b\}$

$= \{a, b\}, \{\{a, b\}\}$

b) $[\cup \{\{a\}, \{a, b\}, [\cap \{\{c, d\}, \{d, e, f\}\}]$

$= \{a, b\}, \{\{a, b\}\}$

c) $2^{(1,2)} - 2^{(1,3)}$

$= \{\{1, 2\}\} - \{\{1, 3\}\}$
$= \{\{1, 2\}\}, \{\{1, 3\}\}$

d) $2^{(a,b)} \times \{a, b\}$

$= \{\{a, b\}\} \times \{a, b\}$
$= \{\{\{a, b\}\}, a\}, \{\{\{a, b\}\}, b\}$

e) $\{1\} \times \{1, 2\} \times \{1, 3\}$

$= \{(1, 1), (1, 2)\} \times \{1, 3\}$
$= \{((1, 1), 1), ((1, 1), 3), ((1, 2), 1), ((1, 2), 3)\}$

5. $\{\emptyset, \{\emptyset\}, \{\emptyset, \emptyset\}, \{\emptyset, \{\emptyset\}\}, \{\emptyset, \{\{\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}\}\}\}$

$= 5$.