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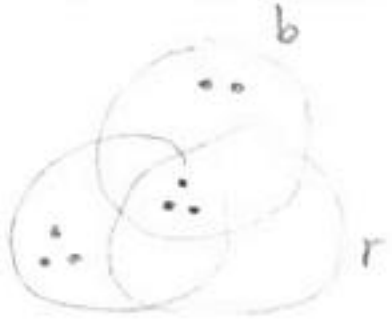
Short Quiz #3 (11-Feb): CSC-2259: Discrete Structures, Sp 2020
Your answers must be to the point. Total = 20; marks for each question is shown in [ ].

LastName: Le FirstName Kha

1. Give the maximum #(big, sour, and ripe fruits), when we have b = #(big fruits), s = #(sour fruits), and r = #(ripe fruits). [2]

   Give a Venn diagram to explain the above answer when $b = 5$, $s = 6$, and $r = 3$.

   max #(big, sour, and ripe fruit) = min(b, s, r)



2. State in English the following situations (use sentences like "I have ···" that we have been using; avoid using "not" as much as possible.) [2+2+2]

   (a) "$H = W$": I have exactly everything that I want

   (b) $|H| = |W|$. I have the same number of things as the number of things I want.

   (c) $H \subseteq W$. I want everything that I have

   I have some thing(s) that I want

   Express the following situations using set notuation (avoid the use of complement as much as possible). [2+2]

   (d) I don't have something(s) that I want. $H^c \cap W \neq \emptyset$

   $H \cap W \neq \emptyset$ } other cases
   $W \not\subseteq H$ }

   (e) I have every thing that I want. $H \supseteq W$

   (f) I have every thing that I do not want. $H \supseteq W^c$

3. Cross out one of (i)-(ii) below that is not true; also, give an example of H and W to illustrate the false-case in (i)-(ii). [2+2]

   (i) $H = W$ implies $|H| = |W|$.
   (ii) ~~$|H| = |W|$ implies $H = W$.~~

   example: $H = \{a, b, c, d, e\}$

   $W = \{f, g, h, i, j\}$

4. Suppose there are 4 things that we are talking about. Answer the following. [2+1+1]

   (i) How many ways can we choose H and W such that $H = W$?

   $2^4 = 16$

   (ii) How many ways can we choose H and W such that $H \subseteq W$, when we know $|H|$?

   $C(4, |H|) \cdot 2^{|H|}$ ← $n - |H|$

   (ii) How many ways can we choose H and W such that $H \subseteq W$?

81

$1 + 4 + 6 + 4 + 16 + 32 + 24 + 81$

$16 + 32 + 24 + 81$

$72 + 9 = 81$