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Nama : Muchammad Danigal Kaulzar
NIM : 21/479067/TK/52800
Kelas : B
Prodi : Teknologi Informasi

UTS Matematika Diskret

Tipe A.

A1. Tunjukkan preparasi dibawah adalah tautologi
a. $S = (P \wedge Q) \vee (\neg P \vee (P \wedge \neg Q))$
Tautologi harus bernilai true untuk semua nilai P dan Q.
S = True

P	Q	$P \wedge Q$	$\neg P \vee (P \wedge \neg Q)$	S
T	T	T	F	T
T	F	F	T	T
F	T	F	T	T
F	F	F	T	T

Jadi, $S = (P \wedge Q) \vee (\neg P \vee (P \wedge \neg Q))$ adalah tautologi

A2. Gunakan logika inferensi untuk menurunkan kesimpulan - S
$(S \vee q) \rightarrow P$ (Premis)
$\sim a$ (Premis)
$P \rightarrow a$ (Premis)
* $(S \vee q) \rightarrow P$
$P \rightarrow a$,
$(S \vee q) \rightarrow a$
$\sim(S \vee q) \rightarrow \sim a$
$\sim(S \vee q) = \sim S \wedge \sim q$
$\therefore \sim S$

Tipe B. x, y, x_i where $i = \{1, 2, \ldots 11\}$ from student number.
$x = 2$, $N = 1$, $X_i = \{0, 0, 8, 2, 5, 7, 6, 0, 9, 7, 9\}$
B0. $A = 9 - 8 + 1 = 2$
$B = 0 + 0 + 0 + 1 = 1$

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B1. Basis element : $v(0) = 2$, $v(1) = 1$

Recursive rule : If a and b is in v then $a+b$ is in v.

$v(n) = v(n-1) + v(n-2)$

$v(2) = 2+1 = 3$

$v(3) = 3+1 = 4$

$v(4) = 4+3 = 7$

$v(5) = 7+4 = 11$

$v(6) = 11+7 = 18$

$v(7) = 18+11 = 29$

Set v is subset of nonnegative integers. Let $v(0) = 2$. $v(0)$ is a non-negative integer. $v(1) = 1$, $v(2) = 3$, and so on that every member of v is non negative integer. So, $v \subseteq \mathbb{Z}^+$

B2. $A = 2$, $B = 1$, $C = 1$

$P(n): 2 + \frac{1}{A} + \frac{1}{B} + \left(\frac{1}{A} + \frac{1}{B}\right)^2 + \dots + \left(\frac{1}{A} + \frac{1}{B}\right)^n \leq \frac{2\left(\frac{2}{C}\right)^{n+1} - 2}{\frac{2}{C} - 1}$

$P(n): 2 + \frac{1}{2} + 1 + \left(\frac{1}{2} + 1\right)^2 + \dots + \left(\frac{1}{2} + 1\right)^n \leq \frac{2(2)^{n+1} - 2}{2-1}$

$n = 1$. $P(1): 2 + \frac{1}{2} + 1 \leq \frac{2 \cdot 2^2 - 2}{2-1}$

$3\frac{1}{2} \leq 6$ (True)

Assume $n = k$

$P(k): 2 + \frac{1}{2} + 1 + \left(\frac{1}{2} + 1\right)^2 + \dots + \left(\frac{1}{2} + 1\right)^k \leq \frac{2(2)^{k+1} - 2}{1}$

For $n = k+1$

$P(k+1): 2 + \frac{1}{2} + 1 + \left(\frac{1}{2} + 1\right)^2 + \dots + \left(\frac{1}{2} + 1\right)^k + \left(\frac{1}{2} + 1\right)^{k+1} \leq \frac{2(2)^{k+2} - 2}{1}$

from $P(k) \rightarrow 2 + \frac{1}{2} + 1 + \left(\frac{1}{2} + 1\right)^2 + \dots + \left(\frac{1}{2} + 1\right)^k + \left(\frac{1}{2} + 1\right)^{k+1} \leq 2(2)^{k+1} - 2 + \left(\frac{1}{2} + 1\right)^{k+1}$

$2 \cdot 2^{k+1} - 2 + \left(\frac{1}{2} + 1\right)^{k+1} \leq 2 \cdot 2^{k+2} - 2$

$\frac{3^{k+1}}{2^{k+1}} \leq 4 \cdot 2^{k+1} - 2 \cdot 2^{k+1}$

$3^{k+1} \leq 2 \cdot 2^{k+1} \cdot 2^{k+1}$

$3^{k+1} \leq 2 \cdot 4^{k+1}$

Because the basis of the power is true and k is a positive integer. So, $n = k+1$ is true.

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B3. $P = \{2, 3, 4, 7, 11, 18, 29\}$

* starting in even and ended with Even

$P_1 = \underline{3}\ \underline{5}\ \underline{4}\ \underline{3}\ \underline{2} = 3.5.4.3.2 = 360$

* starting in even and ended with prime

$P_2 = \underline{2}\ \underline{5}\ \underline{4}\ \underline{3}\ \underline{4} = 2.5.4.3.4 = 360$ (starting without 2)

$P_3 = \underline{3}\ \underline{5}\ \underline{4}\ \underline{3}\ \underline{3} = 3.5.4.3.3 = 540$ (starting with 2, and not ended with 2)

total possible string $= P_1 + P_2 + P_3$

$= 360 + 360 + 540 = 1260$

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Tipe C.

C1. P(tunai) = 0,2
P(kredit) = 0,9
P(debit | >1jt) = 0,6

a. P(tunai) = 0,2

b. tunai & kredit = 0,3
debit = 0,4
P(debit) = 0,4

c. P(>1jt) = 0,65
P(Tunai | >1jt) = 0,25
P(Tunai and 1jt) = P(Tunai | >1jt) · P(>1jt)
= 0,65 · 0,25
= 0,1625 = 16,25 %

d. P(Tunai) = 0,3

$$P(>1jt \mid Tunai) = \frac{P(Tunai \mid >1jt) \cdot P(>1jt)}{P(Tunai)}$$

$$= \frac{0,25 \cdot 0,65}{0,3} = 0,541667$$

= 54,1667 %

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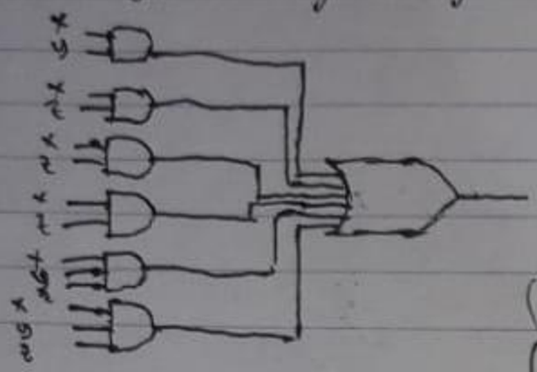
C2. Sederhanakan rangkaian digital berikut



$\Rightarrow xy + xz + x'z + xz + xy'z' + x'yz$

(idempotent law) $= xy + xz + x'z + xy'z' + x'yz$

(De morgan) $= xy + xz + x'z + x(y+z)' + x'yz$

(Distributive) $= x(y+z) + x'z + x(y+z)' + x'yz$

(Distributive) $= x((y+z) + (y+z)') + x'z + x'yz$

(unit property) $= x(1) + x'z + x'yz$

(Distributive) $= x + x'z(1+y)$

(Reorganitive) $= x + x'z \cdot (1)$

(Distributive) $= (x+x')(x+z)$

(Unit property) $= 1(x+z)$

$= x + z$