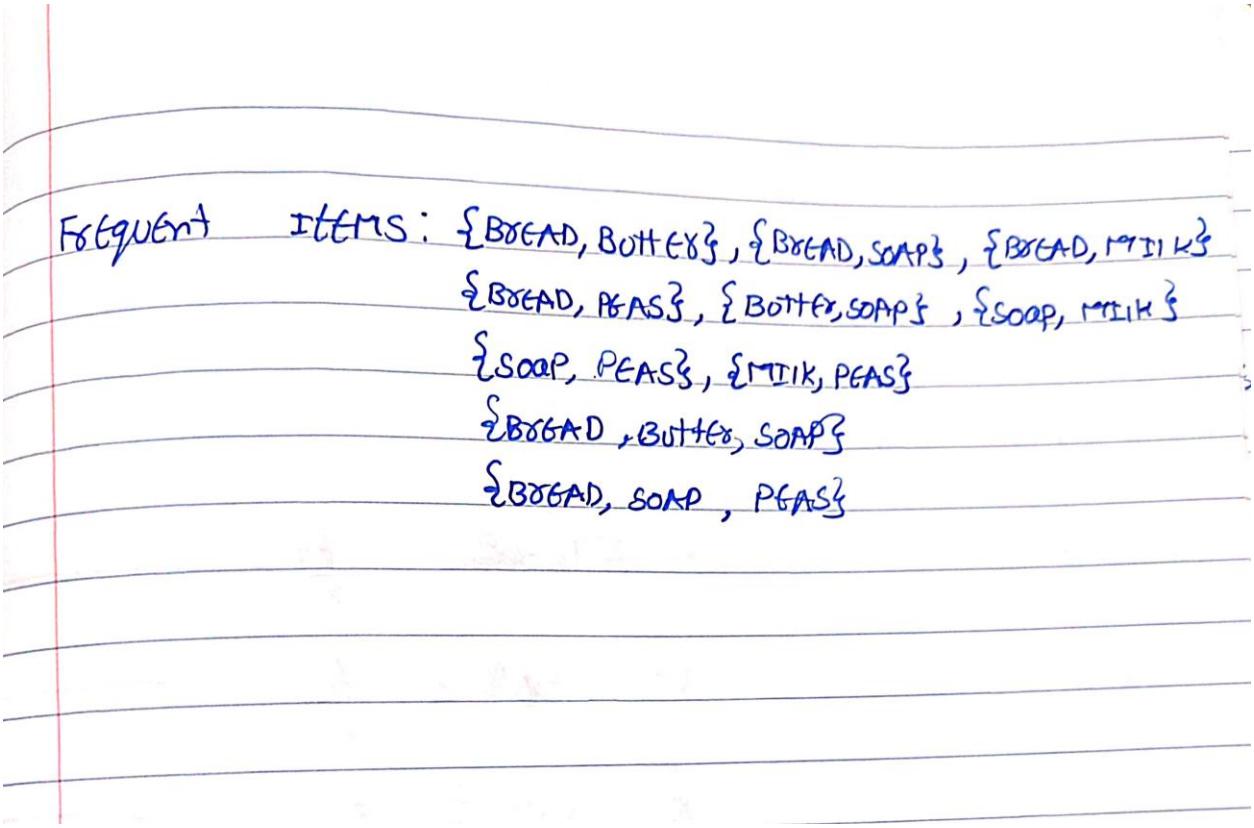
(a) For a minimum support threshold of 30%, apply the concept of the apriori algorithm and identify all the frequent itemsets. Manual calculations on paper only, and show your analysis steps.



BREAD - 7

BUTTER - 6

SOAP - 8

~~MILK~~

MILK - 5

PEAS - 6

32

@ MIN.
Support Threshold = 30%

ITEMS : BREAD, BUTTER, SOAP, MILK, PEAS

2 ITEMS — Total Transactions = 10

Support for {BREAD} => {BUTTER} = $\frac{4}{10}$ = 40% - ✓

Support for {BREAD} => {SOAP} = $\frac{6}{10}$ = 60% - ✓

BREAD { Support for {BREAD} => {MILK} = $\frac{3}{10}$ = 30% - ✓

Support for {BREAD} => {PEAS} = $\frac{4}{10}$ = 40% - ✓

Support for {BUTTER} => {SOAP} = $\frac{5}{10}$ = 50% - ✓

BUTTER { Support for {BUTTER} => {MILK} = $\frac{1}{10}$ = 10%

Support for {BUTTER} => {PEAS} = $\frac{2}{10}$ = 20%

SOAP { Support for {SOAP} => MILK = $\frac{3}{10}$ = 30% ✓

Support for {SOAP} => PEAS = $\frac{5}{10}$ = 50% - ✓

PEAS Suppor for {MILK} => PEAS = $\frac{3}{10}$ = 30% - ✓

{BUTTER, SOAP}

3 Items

Support for {BREAD, butter} => SOAP = $\frac{4}{10}$ = 40% ✓

Support for {BREAD, Butter} => MILK = $\frac{1}{10}$ = 10%

Support for {BREAD, Butter} => PEAS = $\frac{1}{10}$ = 10%

Support for {BREAD, ~~SOAP~~ MILK} => ~~MILK~~ SOAP = $\frac{2}{10}$ = 20%

Support for {BREAD, SOAP} => PEAS = $\frac{3}{10}$ = 30% ✓

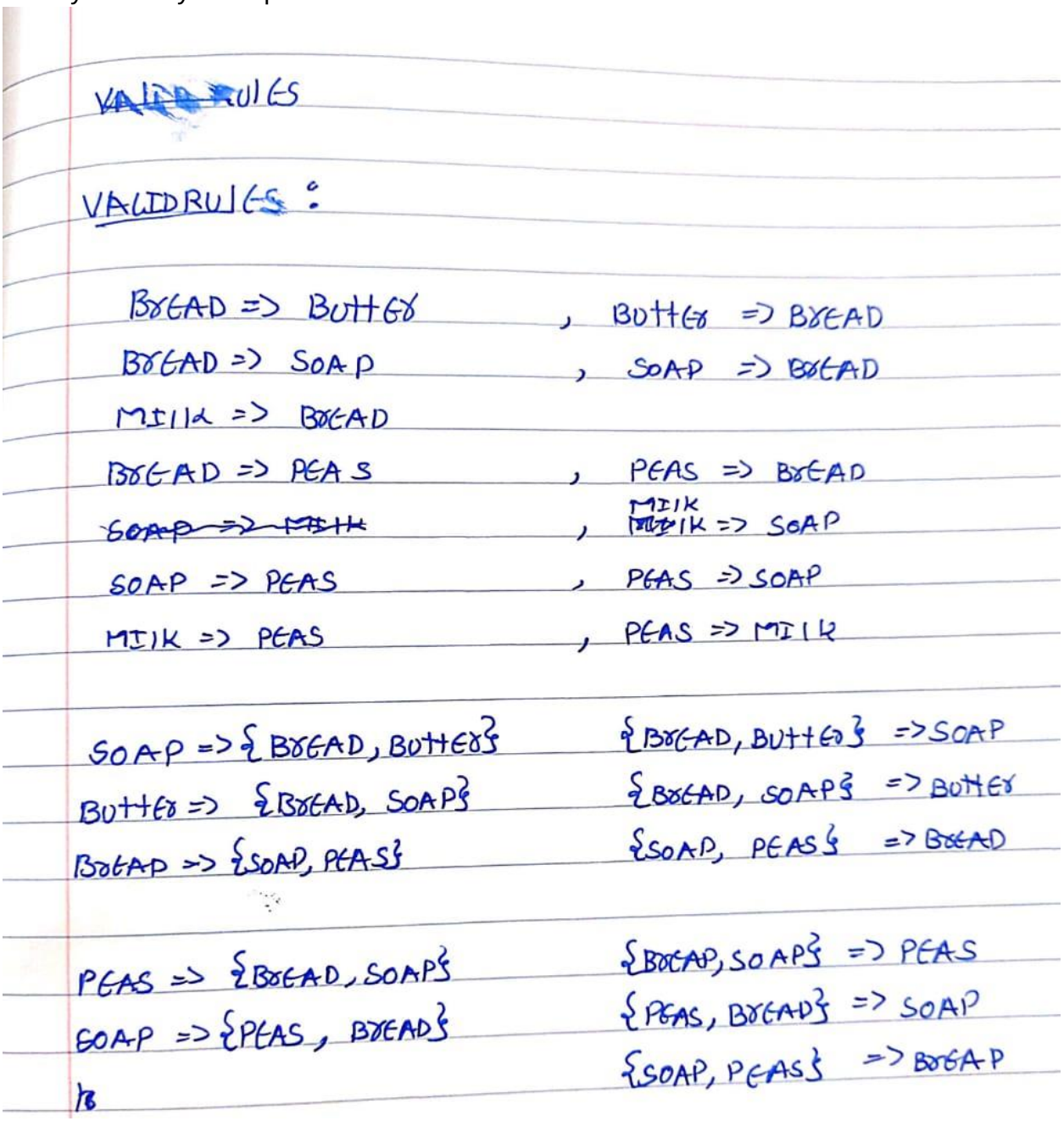
Support for {BREAD, MILK} => PEAS = $\frac{2}{10}$ = 20%

Support for {Butter, ~~MILK~~ SOAP} => PEAS = $\frac{1}{10}$ = 10%

Support for {SOAP, PEAS, MILK} = $\frac{1}{10}$ = 10%

Support for {BUTTER, PEAS, MILK} = $\frac{1}{10}$ = 10%

(b) Now, for a minimum confidence threshold of 50%, apply the concept of the apriori algorithm and identify all valid association rules. Manual calculations on paper only, and show your analysis steps.



✓ 57% ~~50%~~ < $\frac{4}{7}$

✓ 50% < $\frac{6}{7}$

X 50% ~~≥~~ $\frac{3}{7}$

✓ 66% · ~~4/6~~

✓ 50% < $\frac{3}{5}$

✓ 50% < $\frac{5}{6}$

✓ 50% < $\frac{3}{5}$

confidance for {BREAD, BUTTER} = $\frac{4}{6} = \frac{2}{3} = 66\%$

confidance for {BREAD, SOAP} = $\frac{6}{8} = \frac{3}{4} = 75\%$

confidance for {BREAD, MILK} = $\frac{3}{5} = 60\%$

confidance for {BREAD, PEAS} = $\frac{4}{7} = 57\%$

confidance for {SOAP, MILK} = $\frac{3}{8} \leq 50\%$

confidance for {SOAP, PEAS} = $\frac{5}{8} \geq 50\%$

confidance for {MILK, PEAS} = $\frac{3}{6} = 50\%$

confidACC for {BREAD SOAP} => {BREAD, BUTTER} = 4/8 = 50

BUTTER => {BREAD, SOAP} = 4/6 = 2/3 = 66

BREAD => {BUTTER, SOAP} = 4/7 = 57%

{BREAD, BUTTER} => SOAP = 4/4 = 100 4/4 = 100%

{BREAD, SOAP} => BUTTER = 4/6 = 2/3 = 66%

{BUTTER, SOAP} => BREAD = 4/5 = 90%

PEAS => {BREAD, SOAP}

confidACNC for {BREAD, SOAP} => PEAS = 3/6 = 50%

SOAP => {PEAS, BREAD} = 3/8 = 2 < 66%

BREAD => {SOAP, PEAS} = 3/7 < 50%

{BREAB, SOAP} => PEAS = 3/6 = 50%

{PEAS, BREAD} => SOAP 3/4 > 58%

{SOAP, PEAS} => BREAD 3/5 > 5%

Question 2 answers: