

# Homework 1

CPCS 433

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## Part 1:

- (1) Find all frequent itemsets of size 1 having support  $\geq 0.3$ ;

	items	support
1	{diabers=FALSE}	0.3
2	{cookies=FALSE}	0.4
3	{milk=FALSE}	0.4
4	{Beer=TRUE}	0.5
5	{Bread=FALSE}	0.5
6	{Butter=FALSE}	0.5
7	{Beer=FALSE}	0.5
8	{Bread=TRUE}	0.5
9	{Butter=TRUE}	0.5
10	{milk=TRUE}	0.6
11	{cookies=TRUE}	0.6
12	{diabers=TRUE}	0.7

- (2) Find all frequent itemsets of size 2 having support  $\geq 0.3$ ;

	Items	support
[1]	{Beer=FALSE,diabers=FALSE}	0.3
[2]	{Bread=TRUE,diabers=FALSE}	0.3
[3]	{Butter=TRUE,diabers=FALSE}	0.3
[4]	{milk=TRUE,cookies=FALSE}	0.3
[5]	{Beer=TRUE,milk=FALSE}	0.3
[6]	{milk=FALSE,cookies=TRUE}	0.3
[7]	{diabers=TRUE,milk=FALSE}	0.3
[8]	{Beer=TRUE,Bread=FALSE}	0.4
[9]	{Beer=TRUE,Butter=FALSE}	0.4
[10]	{Beer=TRUE,cookies=TRUE}	0.3
[11]	{Beer=TRUE,diabers=TRUE}	0.5
[12]	{Bread=FALSE,Butter=FALSE}	0.5
[13]	{Bread=FALSE,milk=TRUE}	0.3
[14]	{Bread=FALSE,cookies=TRUE}	0.3
[15]	{Bread=FALSE,diabers=TRUE}	0.5
[16]	{Butter=FALSE,milk=TRUE}	0.3
[17]	{Butter=FALSE,cookies=TRUE}	0.3
[18]	{Butter=FALSE,diabers=TRUE}	0.5
[19]	{Beer=FALSE,Bread=TRUE}	0.4
[20]	{Beer=FALSE,Butter=TRUE}	0.4
[21]	{Beer=FALSE,milk=TRUE}	0.4
[22]	{Beer=FALSE,cookies=TRUE}	0.3
[23]	{Bread=TRUE,Butter=TRUE}	0.5
[24]	{Bread=TRUE,milk=TRUE}	0.3
[25]	{Bread=TRUE,cookies=TRUE}	0.3
[26]	{Butter=TRUE,milk=TRUE}	0.3
[27]	{Butter=TRUE,cookies=TRUE}	0.3
[28]	{milk=TRUE,cookies=TRUE}	0.3
[29]	{diabers=TRUE,milk=TRUE}	0.4
[30]	{diabers=TRUE,cookies=TRUE}	0.5

- (3) Find all frequent itemsets of size 3 having support  $\geq 0.3$ ;

	Items	support
[1]	{Beer=FALSE,Bread=TRUE,diabers=FALSE}	0.3
[2]	{Beer=FALSE,Butter=TRUE,diabers=FALSE}	0.3
[3]	{Bread=TRUE,Butter=TRUE,diabers=FALSE}	0.3
[4]	{Beer=TRUE,diabers=TRUE,milk=FALSE}	0.3
[5]	{Beer=TRUE,Bread=FALSE,diabers=TRUE}	0.4
[6]	{Beer=TRUE,Bread=FALSE,diabers=TRUE}	0.4
[7]	{Beer=TRUE,Butter=FALSE,diabers=TRUE}	0.4
[8]	{Beer=TRUE,diabers=TRUE,cookies=TRUE}	0.3
[9]	{Bread=FALSE,Butter=FALSE,milk=TRUE}	0.3
[10]	{Bread=FALSE,Butter=FALSE,cookies=TRUE}	0.3
[11]	{Bread=FALSE,Butter=FALSE,diabers=TRUE}	0.5
[12]	{Bread=FALSE,diabers=TRUE,milk=TRUE}	0.3
[13]	{Bread=FALSE,diabers=TRUE,cookies=TRUE}	0.3
[14]	{Butter=FALSE,diabers=TRUE,milk=TRUE}	0.3
[15]	{Butter=FALSE,diabers=TRUE,cookies=TRUE}	0.3

[16]	{Beer=FALSE,Bread=TRUE,Butter=TRUE}	0.4
[17]	{Beer=FALSE,Bread=TRUE,milk=TRUE}	0.3
[18]	{Beer=FALSE,Butter=TRUE,milk=TRUE}	0.3
[19]	{Bread=TRUE,Butter=TRUE,milk=TRUE}	0.3
[20]	{Bread=TRUE,Butter=TRUE,cookies=TRUE}	0.3
[21]	{diabers=TRUE,milk=TRUE,cookies=TRUE}	0.3

(4) generate rules that have confidence  $\geq 0.6$  for the transactions below.

	rules
[1]	{Beer=FALSE,diabers=FALSE} => {Bread=TRUE}
[2]	{Bread=TRUE,diabers=FALSE} => {Beer=FALSE}
[3]	{Beer=FALSE,Bread=TRUE} => {diabers=FALSE}
[4]	{Beer=FALSE,diabers=FALSE} => {Butter=TRUE}
[5]	{Butter=TRUE,diabers=FALSE} => {Beer=FALSE}
[6]	{Beer=FALSE,Butter=TRUE} => {diabers=FALSE}
[7]	{Bread=TRUE,diabers=FALSE} => {Butter=TRUE}
[8]	{Butter=TRUE,diabers=FALSE} => {Bread=TRUE}
[9]	{Bread=TRUE,Butter=TRUE} => {diabers=FALSE}
[10]	{Beer=TRUE,milk=FALSE} => {diabers=TRUE}
[11]	{diabers=TRUE,milk=FALSE} => {Beer=TRUE}
[12]	{Beer=TRUE,diabers=TRUE} => {milk=FALSE}
[13]	{Beer=TRUE,Bread=FALSE} => {Butter=FALSE}
[14]	{Beer=TRUE,Butter=FALSE} => {Bread=FALSE}
[15]	{Bread=FALSE,Butter=FALSE} => {Beer=TRUE}
[16]	{Beer=TRUE,Bread=FALSE} => {diabers=TRUE}
[17]	{Beer=TRUE,diabers=TRUE} => {Bread=FALSE}
[18]	{Bread=FALSE,diabers=TRUE} => {Beer=TRUE}
[19]	{Beer=TRUE,Butter=FALSE} => {diabers=TRUE}
[20]	{Beer=TRUE,diabers=TRUE} => {Butter=FALSE}
[21]	{Butter=FALSE,diabers=TRUE} => {Beer=TRUE}
[22]	{Beer=TRUE,cookies=TRUE} => {diabers=TRUE}
[23]	{Beer=TRUE,diabers=TRUE} => {cookies=TRUE}
[24]	{diabers=TRUE,cookies=TRUE} => {Beer=TRUE}
[25]	{Bread=FALSE,Butter=FALSE} => {milk=TRUE}
[26]	{Bread=FALSE,milk=TRUE} => {Butter=FALSE}
[27]	{Butter=FALSE,milk=TRUE} => {Bread=FALSE}
[28]	{Bread=FALSE,Butter=FALSE} => {cookies=TRUE}
[29]	{Bread=FALSE,cookies=TRUE} => {Butter=FALSE}
[30]	{Butter=FALSE,cookies=TRUE} => {Bread=FALSE}
[31]	{Bread=FALSE,Butter=FALSE} => {diabers=TRUE}
[32]	{Bread=FALSE,diabers=TRUE} => {Butter=FALSE}
[33]	{Butter=FALSE,diabers=TRUE} => {Bread=FALSE}
[34]	{Bread=FALSE,milk=TRUE} => {diabers=TRUE}
[35]	{Bread=FALSE,diabers=TRUE} => {milk=TRUE}
[36]	{diabers=TRUE,milk=TRUE} => {Bread=FALSE}
[37]	{Bread=FALSE,cookies=TRUE} => {diabers=TRUE}
[38]	{Bread=FALSE,diabers=TRUE} => {cookies=TRUE}
[39]	{diabers=TRUE,cookies=TRUE} => {Bread=FALSE}
[40]	{Butter=FALSE,milk=TRUE} => {diabers=TRUE}
[41]	{Butter=FALSE,diabers=TRUE} => {milk=TRUE}
[42]	{diabers=TRUE,milk=TRUE} => {Butter=FALSE}
[43]	{Butter=FALSE,cookies=TRUE} => {diabers=TRUE}
[44]	{Butter=FALSE,diabers=TRUE} => {cookies=TRUE}
[45]	{diabers=TRUE,cookies=TRUE} => {Butter=FALSE}
[46]	{Beer=FALSE,Bread=TRUE} => {Butter=TRUE}
[47]	{Beer=FALSE,Butter=TRUE} => {Bread=TRUE}
[48]	{Bread=TRUE,Butter=TRUE} => {Beer=FALSE}
[49]	{Beer=FALSE,Bread=TRUE} => {milk=TRUE}
[50]	{Beer=FALSE,milk=TRUE} => {Bread=TRUE}
[51]	{Bread=TRUE,milk=TRUE} => {Beer=FALSE}
[52]	{Beer=FALSE,Butter=TRUE} => {milk=TRUE}
[53]	{Beer=FALSE,milk=TRUE} => {Butter=TRUE}
[54]	{Butter=TRUE,milk=TRUE} => {Beer=FALSE}
[55]	{Bread=TRUE,Butter=TRUE} => {milk=TRUE}
[56]	{Bread=TRUE,milk=TRUE} => {Butter=TRUE}
[57]	{Butter=TRUE,milk=TRUE} => {Bread=TRUE}
[58]	{Bread=TRUE,Butter=TRUE} => {cookies=TRUE}

[59]	{Bread=TRUE,cookies=TRUE} => {Butter=TRUE}
[60]	{Butter=TRUE,cookies=TRUE} => {Bread=TRUE}
[61]	{milk=TRUE,cookies=TRUE} => {diabers=TRUE}
[62]	{diabers=TRUE,milk=TRUE} => {cookies=TRUE}
[63]	{diabers=TRUE,cookies=TRUE} => {milk=TRUE}

Part 2:

- (1) Find all frequent itemsets of size 2 having support  $\geq 0.5$ ;

	items	support
[1]	{Beer=TRUE,diabers=TRUE}	0.5
[2]	{Bread=FALSE,Butter=FALSE}	0.5
[3]	{Bread=FALSE,diabers=TRUE}	0.5
[4]	{Butter=FALSE,diabers=TRUE}	0.5
[5]	{Bread=TRUE,Butter=TRUE}	0.5
[6]	{diabers=TRUE,cookies=TRUE}	0.5

- (2) Find all frequent itemsets of size 3 having support  $\geq 0.5$ ;

	items	support
[1]	{Bread=FALSE,Butter=FALSE,diabers=TRUE}	0.5

- (3) Find all frequent itemsets of size 4 having support  $\geq 0.5$ ;

There is no frequent itemset with support  $\geq 0.5$  and size 4

- (4) generate rules that have confidence  $\geq 0.75$  for the transactions below.

Just like what we said in the previous question there is no frequent itemset with size 4 and  $\geq 0.5$  support