## Proteomics

## WS 2014/15

## Exercises 9

## 1. Protein ambiguity groups

Given 5 proteins A, B, C, D, E, each of which contains several identified peptides (1,2,3, $\ldots, 8$ )
A: $1,2,3,4,5$
B: $1,2,3,4$
C, 2,3,4,5,6
D: $6,7,8$
E: 5,6
Which proteins are distinct from D?
Which are differentiable from A?

## 2. ProteinProphet (Multiple choice with single answer)

Assume PeptideProphet computes three scores for 3 PSMs A, B, C: 0.6,0.7,0.92. $\mathrm{A}, \mathrm{B}, \mathrm{C}$ correspond to the same peptide TPEVDDEALEK, which is contained in protein LACB_ BOVIN. Which value will be used by ProteinProphet as the probability that a peptide assignment corresponding to the protein LACB_ BOVIN is correct?

- 0.7
- 0.92
- 0.74
- 0.6


## 3. ProteinProphet 2

Assume proetin A contains 3 identified peptides X, Y, Z. X, Y are unique and only peptide Z is shared by another protein $B$. In protein $B, Z$ is found as the only identified peptide. The weight $w_{A}^{Z}$ is computed as 0.2 by learning the model. If $p(+\mid D, N S P=0)$ for peptide Z is calculated as 0.6 , what is the probability that protein B is present in the sample?
Based on the overall NSP distribution, the probability $p(+\mid D, N S P)$ for peptide $\mathrm{X}, \mathrm{Y}$, Z in Protein A is $0.6,0.9,0.3$, what is the probability that protein A is present in the sample?

## 4. ProteinProphet 3

Given a protein A that contains 3 identified peptides X, Y, Z. The best PeptideProphet estimates of $\mathrm{X}, \mathrm{Y}, \mathrm{Z}$ are $0.6,0.7,0.9$, respectively. What is the number of sibling peptides (NSP) for peptide X? How about the NSP for peptide Y?

## 5. Inference through quantification 1

The relative abundance ratio of peptides A,B,C,D is 1.9, 1.4, 1.02, 1.04, respectively. If protein Z is supported by two distinct peptides C and D .

Then the relatice abundance ratio of protein Z is
6. Inference through quantification 2 (Multiple choice with single answer)

Protein X is quantified by three identified peptides $\mathrm{A}, \mathrm{B}, \mathrm{C}$ in a quantification experiment. B and C are also contained in protein Y and Z . The relative abundance ratio of peptides $\mathrm{A}, \mathrm{B}, \mathrm{C}$ is $1.9,1.4,1.02$. What is the relatice abundance ratio of protein X ?

- 1.21
- 1.44
- 1.9
- 1.4


## 7. MAYU for Protein FDR estimates

Assmue there are 20 protein entries input and 5 target, 5 decoy protein identifications are found in the end. what is the MAYU FDR for the 5 target protein IDs?

