Matt Skerritt/David Sherwood's workshop, Monday 2-4pm **Quiz 1b**

Name: .... Student ID: ....

If this is not your normal workshop, then please state which one is:

Demonstrator: .... Weekday: .... Time: ....

(Demonstrator's use only) Points achieved: out of 4

Instructions: If you run out of space in a question, do use the empty page(s) at the end of the quiz and indicate at the respective question that the working continues at the end of the paper. Always show your working in written answer questions, unless stated otherwise. You have 20 minutes for this quiz.

Solutions

1.

(a) Write down the power set of $\{1, 2, \{1, 2\}\}$.

(b) For every $r \in \mathbb{Z}$ let $\mathcal{U}_r := \{x \in \mathbb{Z} : x \leqslant r\}$. What does the union of all such $\mathcal{U}_r$ result in? Equivalently, what is $\bigcup_{r=-\infty}^{\infty} \mathcal{U}_r = \cdots \cup \mathcal{U}_{-2} \cup \mathcal{U}_{-1} \cup \mathcal{U}_0 \cup \mathcal{U}_1 \cup \mathcal{U}_2 \cup \cdots$?

1 solution:

(a) $\{\emptyset, \{1\}, \{2\}, \{\{1, 2\}\}, \{1, 2\}, \{1, \{1, 2\}\}, \{2, \{1, 2\}\}, \{1, 2, \{1, 2\}\}\}$

(b) $\mathbb{Z}$

2.

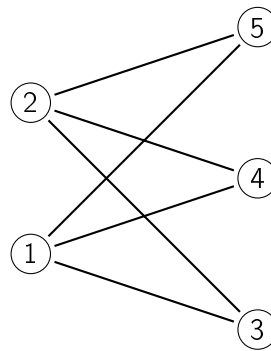(a) Write down an incidence matrix for the graph K_4.

(b) Draw a graph with incidence matrix

$$\begin{pmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{pmatrix}.$$

2 solution:

(a) $\begin{pmatrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{pmatrix}$

(b)

END OF PAPER