MAU11602 second quiz, week 4
Thu 25/02/21 due 11am Friday 05/03/21

Rules and procedures.
1. Attempt 3 questions. Only *your first three answers* will be marked. **2.** Each question carries 20 marks, so the maximum quiz mark is 60. **3.** If a particular method of solution is stipulated, you get no marks if you don't use it. **4.** ***Show all work.*** No marks will be given for answers which do not show the calculations. **5.** Your answers should be scanned and submitted to Blackboard.

Question 1. Construct a CNF for the following truth-table.

W	X	Y	Z	
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1

W	X	Y	Z	
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

Question 2. A kind of 'accelerated resolution' might be to infer $C \vee D$ from $C \vee X \vee Y, D \vee \overline{X} \vee \overline{Y}$. Why is this *completely wrong*?

Question 3. Use resolution to refute

$$U\overline{W},\ \overline{U}\,W,\ U\overline{Y},\ \overline{U}\,Y,\ V,\ \overline{V}\,XY,\ V\overline{X}\,Y,\ VX\overline{Y},$$
$$\overline{V}\,\overline{X}\,\overline{Y},\ W\overline{X},\ \overline{W}\,X$$

Question 4. Use resolution to refute

$$UVX,\ \overline{U}\,V\overline{X},\ \overline{U}\,\overline{V}\,X,\ U\overline{V}\,\overline{X},\ \overline{U}\,W,\ U\overline{W},\ VWY,\ \overline{V}\,\overline{W}\,Y,$$
$$V\overline{W}\,\overline{Y},\ \overline{V}\,W\overline{Y},\ XY,\ \overline{X}\,\overline{Y}$$

Question 5. Using any result up to 10.12, but nothing later than that, prove

$$A \vdash_{\mathrm{SC}} \neg\neg A$$