

## CS 201: DISCRETE STRUCTURES

### Quiz 1 Solutions

Translate the following English sentences into propositional logic using the following propositions:

T: Today is Thursday

R: It is raining

B: The birds sing

F: Flowers bloom

C: It is Cloudy

Operators you are allowed to use:  $\{\wedge, \vee, \neg, \rightarrow, \leftrightarrow\}$ . **No other operators or propositional symbols are allowed.**

#### PROBLEM 1

Today is Thursday and it is raining.

$$T \wedge R$$

#### PROBLEM 2

The birds do not sing unless it rains.

$$\neg R \rightarrow \neg B$$

$$B \rightarrow R$$

$$\neg B \vee R$$

#### PROBLEM 3

The flowers always bloom only on a Thursday.

$$F \rightarrow T \text{ (if you take the meaning as flowers always bloom on any Thursday)}$$

$$F \leftrightarrow T \text{ (if you take the meaning as flowers always bloom on every Thursday)}$$

#### PROBLEM 4

It is either raining or it is cloudy but not both.

$$\neg (R \leftrightarrow C)$$

$$(\neg R \wedge C) \vee (R \wedge \neg C)$$

#### PROBLEM 5

It rains only if it is cloudy and a Thursday.

$$R \rightarrow C \wedge T$$