# Spring 2018: CSE 5301 – 001, 002
# Homework 3

## Directions

- The assignment has to be submitted on blackboard (http://elearn.uta.edu)
- If its typed, make sure the extension is (.pdf)
- If its handwritten, make sure to scan at high enough dpi that the text is legible and readable
    - Save as .pdf or .png
- If your submission is a single file name it as <net-id>_hw3.<extension>
- If your submission is made of multiple files, zip them together into a single archive
    - Only .zip archives accepted
    - Name the file <net-id>_hw3.zip
    - Contact the instructor or TA if you have any issues creating archives
- **ALL WORK HAS TO BE INDIVIDUAL WORK.**

## Questions

Exercises

9.7, 9.8, 9.10, 9.11, 9.17, 9.18, 9.20 [Use 2% significance], 9.23

Q9: You are given three dice. The first dice is unbiased. The second dice follows the following pmf:

| **x** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **P(x)** | 1/9 | 1/9 | 1/9 | 2/9 | 2/9 | 2/9 |

The third dice follows the following pmf:

| **x** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **P(x)** | 1/9 | 1/9 | 2/9 | 2/9 | 2/9 | 1/9 |

i. Calculate the average amount of information (in bits) encoded by each dice

ii. Calculate the relative entropy (in bits) of:

   a. The second dice w.r.t the first dice

   b. The third dice w.r.t to first dice

   c. The second dice w.r.t to third dice.