**CSCE 221 Cover Page**

# Homework Assignment #3

Due April 24 at 23:59 pm to eCampus

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Please list all sources in the table below including web pages which you used to solve or implement the current homework. If you fail to cite sources you can get a lower number of points or even zero, read more on Aggie Honor System Office website: <http://aggiehonor.tamu.edu/>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of sources |  |  |  |  |
| People |  |  |  |  |
| Web pages (provide URL) |  |  |  |  |
| Printed material | Textbook |  |  |  |
| Other Sources | Lecture Slides |  |  |  |

I certify that I have listed all the sources that I used to develop the solutions/codes to the submitted work.

*On my honor as an Aggie, I have neither given nor received any unauthorized help on this academic work*.

Your Name: Pratik Patel Date: 04/24/2019

## Homework 3 (100 points)

**due April 24 at 11:59 pm to eCampus.**

Write clearly and give full explanations to solutions for all the problems. Show all steps of your work.

## Reading assignment.

* Hash Tables Chap. 9
* Heap and Priority Queue, Chap. 8
* Graphs, Chap. 13

## Problems.

1. (10 points) R-9.7 p. 417

Draw the 11-entry hash table that results from using the has function, *h*(*k*) = (3*k* + 5) mod 11, to hash the keys 12, 44, 13, 88, 23, 94, 11, 39, 20, 16, and 5, assuming collisions are handled by chaining.

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2. (10 points) R-9.8 p. 417

What is the result of the previous exercise, assuming collisions are handled by linear probing?

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3. (10 points) R-9.10 p. 417

What is the result of Exercise R-9.7, when collisions are handled by double hashing using the secondary hash function *hs*(*k*) = 7 *−* (*k* mod 7)?

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4. (10 points) R-8.7 p. 361

An airport is developing a computer simulation of air-traffic control that handles events such as landings and takeoffs. Each event has a *time-stamp* that denotes the time when the event occurs. The simulation program needs to efficiently perform the following two fundamental operations:

* + Insert an event with a given time-stamp (that is, add a future event)
  + Extract the event with smallest time-stamp (that is, determine the next event to process)

Which data structure should be used for the above operations? Why? Provide big-oh asymptotic notation for each operation.

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5. (10 points) R-13.5, p. 654

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6. (10 points) R-13.7, p. 655

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7. (10 points) R-13.16, p. 656

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8. (10 points) R-13.31, p. 657

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9. (10 points) C-13.10, p. 658

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10. (10 points) C-13.15, p. 659

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