

CS 32 WFW

Long Exam 4

October 4, 2013

General Instructions

- Answer the items completely. Show your solutions/justifications when asked.
- Write as legibly as possible. Illegible or unreadable answers and solutions may not merit any points.
- Refrain from making unnecessary motions and sounds during the exam. Any suspicious behavior will be dealt with accordingly.
- Direct all questions to the proctor.
- If you need to go to the CR, hand your questionnaire, answer sheet, and scratch paper to the proctor before heading out. Only one person at any given time is allowed to go out.
- Once you're done with the exam (one way or the other), place your scratch papers and the questionnaire inside your blue book.

Questions

Consider the following table of keys (and their corresponding made up numerical equivalents):

<i>AGNI</i>	-34
<i>ARTEMIS</i>	-17
<i>BEOWULF</i>	2
<i>CERBERUS</i>	5
<i>EBONY</i>	13
<i>IVORY</i>	40
<i>KALINA – ANN</i>	47
<i>NEVAN</i>	67
<i>REBELLION</i>	84
<i>RUDRA</i>	90

1. Assume that the keys were placed inside a *sequential table of size 10*, how would the rearranged table look like in preparation for *multiplicative binary search*?

ANSWER:

<i>KALINA – ANN</i>
<i>CERBERUS</i>
<i>REBELLION</i>
<i>ARTEMIS</i>
<i>IVORY</i>
<i>NEVAN</i>
<i>RUDRA</i>
<i>AGNI</i>
<i>BEOWULF</i>
<i>EBONY</i>

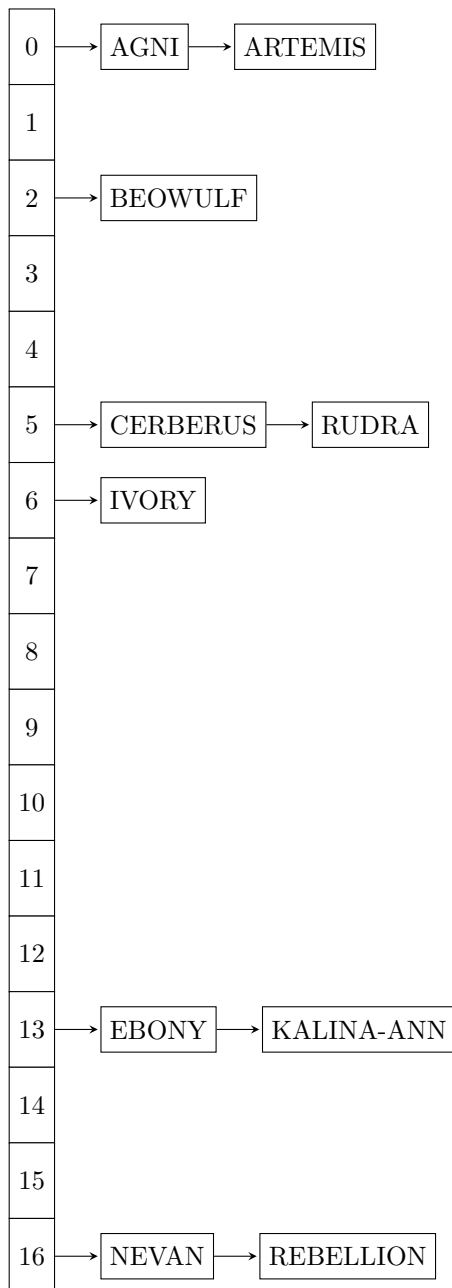
2. Assume that the keys were placed inside an *ordered sequential table of size 10*. Using *Fibonacci search*, how many times would the loop iterate before terminating using the following as search key K:

- (a) ARTEMIS
ANSWER: 4
- (b) ALASTOR
ANSWER: 5
- (c) REBELLION
ANSWER: 2
- (d) YAMATO
ANSWER: 3

Show each step of the computation.

3. Show the final result of inserting the keys (in increasing order) into a *hash table of size 17* using the *division method* when the following collision resolution techniques are used:

- (a) Chaining
ANSWER:



(b) Linear Probing

ANSWER:

0	<i>AGNI</i>
1	
2	<i>BEOWULF</i>
3	
4	<i>RUDRA</i>
5	<i>CERBERUS</i>
6	<i>IVORY</i>
7	
8	
9	
10	
11	
12	<i>KALINA – ANN</i>
13	<i>EBONY</i>
14	<i>REBELLION</i>
15	<i>NEVAN</i>
16	<i>ARTEMIS</i>

(c) Double Hashing, with $h'(k) = 1 + k \bmod (m - 2)$

ANSWER:

0	<i>AGNI</i>
1	
2	<i>BEOWULF</i>
3	<i>ARTEMIS</i>
4	<i>RUDRA</i>
5	<i>CERBERUS</i>
6	<i>IVORY</i>
7	<i>REBELLION</i>
8	
9	
10	<i>KALINA – ANN</i>
11	
12	
13	<i>EBONY</i>
14	
15	
16	<i>NEVAN</i>

4. Assume that the keys were inserted in a hash table of size 17 using the *division method* and with *linear probing* as collision resolution. Show the adjusted table when AGNI is deleted from the table by *rehashing affected entries* in the table.

ANSWER:

0	<i>ARTEMIS</i>
1	
2	<i>BEOWULF</i>
3	
4	<i>RUDRA</i>
5	<i>CERBERUS</i>
6	<i>IVORY</i>
7	
8	
9	
10	
11	
12	<i>KALINA – ANN</i>
13	<i>EBONY</i>
14	
15	<i>REBELLION</i>
16	<i>NEVAN</i>