Name	H1	H2
Aidan Nepal	9bc6cc	42757b
Alexander Aeronautic	4345ae	93249d
Austin Prissy	20b849	8c1ef7
Charlie Maiden	0d6fc1	e5855d
Claire Tva	fe30bf	8124af
Gavin Parallelepiped	0e9b65	db8914
Hunter Fabric	b112a2	78d98d
Isabelle Stack	4c30e6	f7193f
Joshua Polonium	831e15	eeba38
Madison Willoughby	1874dc	911d61
Max Mere	fc7e5b	8d1814
Maya Paddy	107b1e	5e84ff
Natalie Sober	c624de	b46fa3
Noah Porous	ae3e75	2dbc99
Riley Predecessor	f001c1	385e34
Savannah Tradesman	a3d7ee	ab7176
Sophia Keys	69147a	493120

On the left, I have a table of 17 names, and what each name hashes to with two different hash functions, H1 and H2. The hash values are given in hexadecimal.

On the right, I have a 16-element hash table that has been filled in with some of these names.

Please answer the questions below. Do not answer the questions as if one affects the other. Answer them all with respect to the tables shown here. For example, you should not answer part *C* as if Austin Prissy were inserted into the table. Instead, you simply answer with respect to the table above.

In all of the questions, assume that hash function H1 is used to insert into the table, and if double-hashing is used, then hash function H2 is used as the second hash function.

0.	----------
1.	Charlie Maiden
2.	Hunter Fabric
3.	----------
4.	----------
5.	Gavin Parallelepiped
6.	Isabella Stack
7.	----------
8.	----------
9.	----------
10.	Sophia Keys
11.	Max Mere
12.	Aiden Nepal
13.	Madison Willoughby
14.	Savannah Tradesman
15.	Claire Tva

1. What is the load factor of the table (you can give a fraction here)?
2. Into which index will Austin Prissy go into the table, using linear probing?
3. Into which index will Joshua Polonium go into the table, using quadratic probing?
4. Into which index will Maya Paddy go into the table, using double hashing?
5. Into which index will Noah Porous go into the table, using linear probing?
6. Into which index will Riley Predecessor go into the table, using double hashing?

Answers

This came from the 2019 midterm for COSC140.

Since the table size is 16, the last hex digit is the hash index.

- Question *1*: There are 10/16 entries full, so the load factor is 10/16.
- Question *2*: Austin Prissy's index is 9, which is empty, so the answer is 9.
- Question *3*: Joshua Polonium's index is 5. Five is taken, so we check $5+1^2 = 6$. That is taken, so we check $5+2^2 = 9$. That is empty, so the answer is 9.
- Question *4*: Maya Paddy's index is 0xd = 13. 13 is taken, so we'll need to use the second hash value, which is 0xf = 15. This means that we'll be looking at successively smaller indices -- 12, 11, 10, and finally 9.
- Question *5*: Noah Porous' index is 5. Five is taken, so we'll look at successively larger indices -- 6, which is taken, and then 7, which is empty. The answer is 7.
- Question *6*: Riley Predecessor's index is 1. 1 is taken, so we'll need to use the second hash value, which is 4. 5 is taken, but 9 is empty, so the answer is nine.