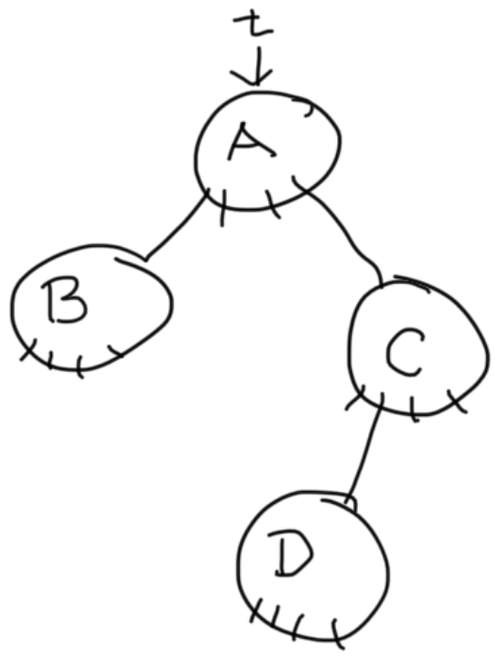
Solution 3

Please let me know if you find any errors.

5. (ungraded) The following figure is an HAMT with four keys (their associated values are not shown). What trailing bits can you deduce for the hashes of A, B, C, and D?



Answer: No path information is needed to find A, so we know nothing about its hash.To get to B, you must follow A's 0-th child (of four children), so hash(B) must end in 00. To get to C you must follow A's 3-rd child so hash(C) must end in 11. To get to D you must follow A's 3-rd child (11) and then C's 1-st child (01) so hash(D) must end 0111.

6. (ungraded) Draw the resulting HAMT when the values have been added with the keys A, B, C, D, E, F (in that order). Your drawing should look similar to the one in Problem 5 (ie, ignoring the values and beginning with root A). Use the following hashes.

```
h(A) = 10010000
h(B) = 10110001
h(C) = 11110011
h(D) = 10000111
h(E) = 10011100
h(F) = 01001101
```

7. (ungraded) Begining with the trie in Problem 5, let's say `s = t.set(E, "e")` is invoked. Let `hash(E) = 00110011`. Draw the resulting tries s and t, including all nodes and links between them. (Don't include any values in your drawing.)

8. (ungraded) Draw all nodes in the resulting structure (including their data element) and indicate which nodes are pointed at by each variable.

```
t = list135()
a = t.cons("A")
b = a.cons("B")
c = a.cons("C")
d = c.cons("D")
e = d.rest()
f = e.cons("F")
```

Answers to 6, 7, and 8: