PL UID: 0

## Question 0: tree_traversal_find_all

### Question 0.3: In-Order

{"tree": "digraph {\nranksep=0.25;\nnode [shape=circle fontsize=18 margin=\"0.03,0.03\"]\nedge [arrowsize=0.5]\n 6 [label=\"L\"]6 -> 1 [arrowsize=0.5]\n 1 [label=\"H\"]1 -> 0 [arrowsize=0.5]\n 0 [label=\"W\"]invis_1_2 [label=\"\",width=.1,style=invis]\n1 -> invis_1_2 [style=invis]\n1 -> 4\n 4 [label=\"I\"]4 -> 3 [arrowsize=0.5]\n 3 [label=\"V\"]3 -> 2 [arrowsize=0.5]\n 2 [label=\"O\"]invis_3_2 [label=\"\",width=.1,style=invis]\n3 -> invis_3_2 [style=invis]\ninvis_3_3 [label=\"\",width=.1,style=invis]\n3 -> invis_3_3 [style=invis]\ninvis_4_2 [label=\"\",width=.1,style=invis]\n4 -> invis_4_2 [style=invis]\n4 -> 5\n 5 [label=\"L\"]invis_6_2 [label=\"\",width=.1,style=invis]\n6 -> invis_6_2 [style=invis]\n6 -> 7\n 7 [label=\"E\"]\n}"}

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Expected: WHOVILLE

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wretwetrwretert

Question 0.2: Pre-Order

{"tree": "digraph {\nranksep=0.25;\nnode [shape=circle fontsize=18 margin=\"0.03,0.03\"]\nedge [arrowsize=0.5]\n 6 [label=\"L\"]6 -> 1 [arrowsize=0.5]\n 1 [label=\"H\"]1 -> 0 [arrowsize=0.5]\n 0 [label=\"W\"]invis_1_2 [label=\"\",width=.1,style=invis]\n1 -> invis_1_2 [style=invis]\n1 -> 4\n 4 [label=\"I\"]4 -> 3 [arrowsize=0.5]\n 3 [label=\"V\"]3 -> 2 [arrowsize=0.5]\n 2 [label=\"O\"]invis_3_2 [label=\"\",width=.1,style=invis]\n3 -> invis_3_2 [style=invis]\ninvis_3_3 [label=\"\",width=.1,style=invis]\n3 -> invis_3_3 [style=invis]\ninvis_4_2 [label=\"\",width=.1,style=invis]\n4 -> invis_4_2 [style=invis]\n4 -> 5\n 5 [label=\"L\"]invis_6_2 [label=\"\",width=.1,style=invis]\n6 -> invis_6_2 [style=invis]\n6 -> 7\n 7 [label=\"E\"]\n}"}

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Expected: LHWIVOLE

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oraoraora

Question 0.1: Post-Order

{"tree": "digraph {\nranksep=0.25;\nnode [shape=circle fontsize=18 margin=\"0.03,0.03\"]\nedge [arrowsize=0.5]\n 6 [label=\"L\"]6 -> 1 [arrowsize=0.5]\n 1 [label=\"H\"]1 -> 0 [arrowsize=0.5]\n 0 [label=\"W\"]invis_1_2 [label=\"\",width=.1,style=invis]\n1 -> invis_1_2 [style=invis]\n1 -> 4\n 4 [label=\"I\"]4 -> 3 [arrowsize=0.5]\n 3 [label=\"V\"]3 -> 2 [arrowsize=0.5]\n 2 [label=\"O\"]invis_3_2 [label=\"\",width=.1,style=invis]\n3 -> invis_3_2 [style=invis]\ninvis_3_3 [label=\"\",width=.1,style=invis]\n3 -> invis_3_3 [style=invis]\ninvis_4_2 [label=\"\",width=.1,style=invis]\n4 -> invis_4_2 [style=invis]\n4 -> 5\n 5 [label=\"L\"]invis_6_2 [label=\"\",width=.1,style=invis]\n6 -> invis_6_2 [style=invis]\n6 -> 7\n 7 [label=\"E\"]\n}"}

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Expected: WHOVILLE

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rerorerorero

Question 0.0: Level-Order

{"tree": "digraph {\nranksep=0.25;\nnode [shape=circle fontsize=18 margin=\"0.03,0.03\"]\nedge [arrowsize=0.5]\n 6 [label=\"L\"]6 -> 1 [arrowsize=0.5]\n 1 [label=\"H\"]1 -> 0 [arrowsize=0.5]\n 0 [label=\"W\"]invis_1_2 [label=\"\",width=.1,style=invis]\n1 -> invis_1_2 [style=invis]\n1 -> 4\n 4 [label=\"I\"]4 -> 3 [arrowsize=0.5]\n 3 [label=\"V\"]3 -> 2 [arrowsize=0.5]\n 2 [label=\"O\"]invis_3_2 [label=\"\",width=.1,style=invis]\n3 -> invis_3_2 [style=invis]\ninvis_3_3 [label=\"\",width=.1,style=invis]\n3 -> invis_3_3 [style=invis]\ninvis_4_2 [label=\"\",width=.1,style=invis]\n4 -> invis_4_2 [style=invis]\n4 -> 5\n 5 [label=\"L\"]invis_6_2 [label=\"\",width=.1,style=invis]\n6 -> invis_6_2 [style=invis]\n6 -> 7\n 7 [label=\"E\"]\n}"}

Expected: LHEWIVLO

435345

## Question 1: h1_2020S_2a_msamericana

### Question 1.19: required_files

No context provided.

No expected answer provided.

## Question 1.18: Array A

No context provided.

[]

['F', 'G', 'H', 'M', 'K', 'T', 'D', 'B']

Question 1.17: InvB

{"res1": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res2": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res3": [{"key": "a", "html": "line 4"}, {"key": "b", "html": "line 5"}, {"key": "c", "html": "line 6"}], "res4": [{"key": "a", "html": "$\\Theta(1)$"}, {"key": "b", "html": "$\\Theta(\\log n)$"}, {"key": "c", "html": "$\\Theta(n)$"}, {"key": "d", "html": "$\\Theta(n\\log n)$"}, {"key": "e", "html": "$\\Theta(n^2)$"}, {"key": "f", "html": "None of these answers is correct."}], "res5": [{"key": "a", "html": "inv B(i)"}, {"key": "b", "html": "inv A(i)"}], "_required_file_names": ["playListAns.cpp"]}

Expected:

345

Question 1.16: res1

a:inv A(i)b:inv B(i)c:fact Ad:fact Be:line 4f:line 5g:line 6

Expected Answer(s)

b:inv B(i)c:fact Ad:fact B

[ "

Question 1.15: res2

[{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"},

{"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}]

Expected: {'key': 'c', 'html': 'fact A'}

b

Question 1.14: res3

[{"key": "a", "html": "line 4"}, {"key": "b", "html": "line 5"}, {"key": "c", "html": "line 6"}]

Expected: {'key': 'c', 'html': 'line 6'}

b

Question 1.13: res4

[{"key": "a", "html": "$\\Theta(1)$"}, {"key": "b", "html": "$\\Theta(\\log n)$"}, {"key": "c", "html": "$\\Theta(n)$"}, {"key": "d", "html": "$\\Theta(n\\log n)$"}, {"key": "e", "html": "$\\Theta(n^2)$"}, {"key": "f", "html": "None of these answers is correct."}]

Expected: {'key': 'e', 'html': '$\\Theta(n^2)$'}

b

Question 1.12: res5

[{"key": "a", "html": "inv B(i)"}, {"key": "b", "html": "inv A(i)"}]

Expected: {'key': 'b', 'html': 'inv A(i)'}

b

## Question 1.11: InvAL

No context provided.

No expected answer provided.

InvAL: 5

Variables: []

Question 1.10: InvAU

No context provided.

No expected answer provided.

InvAU: 5

Variables: []

Question 1.9: variL

No context provided.

No expected answer provided.

variL: 4

Variables: []

Question 1.8: variU

No context provided.

No expected answer provided.

variU: 5

Variables: []

## Question 1.7: basecase

No context provided.

No expected answer provided.

basecase: 345 Variables: []

## Question 1.6: iteration

No context provided.

No expected answer provided.

iteration: 0 Variables: []

## Question 1.5: findNextTrueL

No context provided.

No expected answer provided.

findNextTrueL: 2

Variables: []

## Question 1.4: findNextTrueU

No context provided.

No expected answer provided.

findNextTrueU: 0

Variables: []

## Question 1.3: findNextFalseL

No context provided.

No expected answer provided.

findNextFalseL: 243 Variables: []

## Question 1.2: findNextFalseU

No context provided.

No expected answer provided.

findNextFalseU: 243 Variables: []

Question 1.1: findNextFunTrue

{"res1": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res2": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res3": [{"key": "a", "html": "line 4"}, {"key": "b", "html": "line 5"}, {"key": "c", "html": "line 6"}], "res4": [{"key": "a", "html": "$\\Theta(1)$"}, {"key": "b", "html": "$\\Theta(\\log n)$"}, {"key": "c", "html": "$\\Theta(n)$"}, {"key": "d", "html": "$\\Theta(n\\log n)$"}, {"key": "e", "html": "$\\Theta(n^2)$"}, {"key": "f", "html": "None of these answers is correct."}], "res5": [{"key": "a", "html": "inv B(i)"}, {"key": "b", "html": "inv A(i)"}], "_required_file_names": ["playListAns.cpp"]}

Expected:

9

Question 1.0: findNextFunFalse

{"res1": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res2": [{"key": "a", "html": "inv A(i)"}, {"key": "b", "html": "inv B(i)"}, {"key": "c", "html": "fact A"}, {"key": "d", "html": "fact B"}, {"key": "e", "html": "line 4"}, {"key": "f", "html": "line 5"}, {"key": "g", "html": "line 6"}], "res3": [{"key": "a", "html": "line 4"}, {"key": "b", "html": "line 5"}, {"key": "c", "html": "line 6"}], "res4": [{"key": "a", "html": "$\\Theta(1)$"}, {"key": "b", "html": "$\\Theta(\\log n)$"}, {"key": "c", "html": "$\\Theta(n)$"}, {"key": "d", "html": "$\\Theta(n\\log n)$"}, {"key": "e", "html": "$\\Theta(n^2)$"}, {"key": "f", "html": "None of these answers is correct."}], "res5": [{"key": "a", "html": "inv B(i)"}, {"key": "b", "html": "inv A(i)"}], "_required_file_names": ["playListAns.cpp"]}

Expected:

9

playListAns.cpp

```
void playList(vector<char> &A)

{

    bool Tay = // YOUR CODE HERE!!

        for (int i = 1; i < A.size(); i++)

    {

        int next = findNext(A, i, Tay);

        swap(A[next], A[i]);

        Tay = !Tay;

    }

}
```

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## Question 2: lq02_2a_bestworst

### Question 2.0: students

[{"key": "a", "html": "\n  The best case running time of this function is $\\Omega(n)$.\n  "}, {"key": "b", "html": "\n

The worst case running time of this function is $\\Omega(n)$.\n  "}]

---

Expected: [{'key': 'b', 'html': '\n  The worst case running time of this function is $\\Omega(n)$.\n  '}]

---

a

## Question 0: lq03_1a_inssortitnum

### Question 0.0: int_value

{"a": [14, 42, 95, 95, 95, 30, 97, 95, 91, 21, 76, 82, 57, 61, 0, 56]}

Expected: 5

98