

Script started on 2023-12-10 00:27:07-06:00 [TERM="xterm" TTY="/dev/pts/2" COLUMNS: a_vitale3@ares:~\$ pwd /home/students/a_vitale3 a_vitale3@ares:~\$ cat OuchThats.info Name: Andrew Vitale

Class: CSC121

Activity: Ouch! That's _____

Level: 4

Description:

calculates the temprature through a n length rod for n seconds with a n heat source on the left or right end

a_vitale3@ares:~\$ show-code OuchThats.cpp

OuchThats.cpp:

```
1 #include <iostream>
2 #include <vector>
3 #include <string>
4 #include <limits>
5 #include <cmath>
6
7 using namespace std;
8
9 void rod_output(const vector<int> vec_one, const int heat, const char heat_
10 vector<int> spread_heat(const vector<int> vec_one, const int heat, const cl
11
12 int main()
13 {
14     vector<int> temp_of_rod;
15     int rod_length = 0, initial_temp = 0, time = 0, heat_temp = 0, jump_am
16     char heat_side = 'c';
17     string left_or_right;
18     do
19     {
20         cout << "How long do you want the rod?\n";
21         if (rod_length <= 0 && isdigit(cin.peek())) {
22             cin >> rod_length;
23         }
24         cin.ignore(numeric_limits<streamsize>::max(), '\n');
```

```
25         cout << "What is the inital temperature of the rod?\n";
26         if (initial_temp == 0 && isdigit(cin.peek())) {
27             cin >> initial_temp;
28         }
29         cin.ignore(numeric_limits<streamsize>::max(), '\n');
30         cout << "How many seconds do you want simulated?\n";
31         if (time <= 0 && isdigit(cin.peek())) {
32             cin >> time;
33         }
34         cin.ignore(numeric_limits<streamsize>::max(), '\n');
35         cout << "Does the heat source start at the left end of the rod?\n";
36         cin >> left_or_right;
37         if (left_or_right.find("yes") != string::npos || left_or_right.find
38         {
39             heat_side = 'l';
40         }
41         else
42         {
43             heat_side = 'r';
44         }
45         cin.ignore(numeric_limits<streamsize>::max(), '\n');
46         cout << "What is the starting temperature of the heat source?\n";
47         if (heat_temp == 0 && isdigit(cin.peek())) {
48             cin >> heat_temp;
49         }
50         cin.ignore(numeric_limits<streamsize>::max(), '\n');
51         cout << "What is the number of steps to skip between printings?\n";
52         if (jump_amount < 1 && isdigit(cin.peek())) {
53             cin >> jump_amount;
54         }
55         cin.ignore(numeric_limits<streamsize>::max(), '\n');
56     } while (rod_length <= 0 || time <= 0 || jump_amount < 1);
57
58     for (int increment = 0; increment < rod_length; increment++)
59     {
60         temp_of_rod.push_back(initial_temp);
61     }
62
63     rod_output(temp_of_rod, heat_temp, heat_side);
64     for (int increment = 0; increment <= time; increment++)
65     {
66         temp_of_rod = spread_heat(temp_of_rod, heat_temp, heat_side);
67         if (increment%jump_amount == 0)
68         {
69             cout << endl;
70             rod_output(temp_of_rod, heat_temp, heat_side);
71         }
72     }
73     if (time%jump_amount != 0)
74     {
75         rod_output(temp_of_rod, heat_temp, heat_side);
76     }
77     return 0;
78 }
```

```

79
80 vector<int> spread_heat(const vector<int> vec_one, const int heat, const cl
81 {
82     vector<int> temp;
83     int average, divisor;
84     for (long unsigned int index = 0; index < vec_one.size(); index++)
85     {
86         average = 0;
87         divisor = 0;
88         if (index == 0 && tolower(heat_side) == 'l')
89         {
90             average += heat;
91             divisor++;
92         }
93         else if (index != 0)
94         {
95             average += vec_one[index - 1];
96             divisor++;
97         }
98         average += vec_one[index];
99         divisor++;
100         if (index == vec_one.size() - 1 && tolower(heat_side) == 'r')
101         {
102             average += heat;
103             divisor++;
104         }
105         else if (index != vec_one.size() - 1)
106         {
107             average += vec_one[index + 1];
108             divisor++;
109         }
110         temp.push_back(static_cast<int>(round(average/divisor)));
111     }
112     return temp;
113 }
114
115 void rod_output(const vector<int> vec_one, const int heat, const char heat_
116 {
117     vector<int> temp;
118     if(heat_side == 'l')
119     {
120         temp.push_back(heat);
121     }
122     for (long unsigned int index = 0; index < vec_one.size(); index++)
123     {
124         temp.push_back(vec_one[index]);
125     }
126     if (heat_side == 'r')
127     {
128         temp.push_back(heat);
129     }
130     for (int format = 0; format <= 2; format++)
131     {
132         if (format == 1)

```

```

133     {
134         for (long unsigned int index = 0; index < temp.size(); index++)
135         {
136             if (index == 0)
137             {
138                 cout << "| ";
139             }
140             else
141             {
142                 cout << " | ";
143             }
144             cout << temp[index];
145             if (index == temp.size()-1)
146             {
147                 cout << " | ";
148             }
149         }
150         cout << endl;
151     }
152     else
153     {
154         for (long unsigned int index = 0; index < temp.size(); index++)
155         {
156             if (index == 0)
157             {
158                 cout << "+-";
159             }
160             else
161             {
162                 cout << "-+-";
163             }
164             for (int increment = 0; increment <= log10(temp[index]); in
165             {
166                 cout << "-";
167             }
168             if (index == temp.size() - 1)
169             {
170                 cout << "-+";
171             }
172         }
173         cout << "\n";
174     }
175 }
176 return;
177 }

```

a_vitale3@ares:~\$ CPP OuchThats
OuchThats.cpp***

a_vitale3@ares:~\$./OuchThats.out
How long do you want the rod?
10
What is the initial temperature of the rod?
10

```
How many seconds do you want simulated?
10
Does the heat source start at the left end of the rod?
yes
What is the starting temperature of the heat source?
100
What is the number of steps to skip between printings?
1
+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 40 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 50 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 56 | 26 | 13 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 60 | 31 | 16 | 11 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 63 | 35 | 19 | 12 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 66 | 39 | 22 | 13 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 68 | 42 | 24 | 15 | 11 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 70 | 44 | 27 | 16 | 12 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 71 | 47 | 29 | 18 | 12 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 72 | 49 | 31 | 19 | 13 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 73 | 50 | 33 | 21 | 14 | 11 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
+-----+-----+-----+-----+-----+-----+-----+-----+
a_vitale3@ares:~$ ./OuchThats.out
How long do you want the rod?
10
What is the initial temperature of the rod?
10
How many seconds do you want simulated?
10
Does the heat source start at the left end of the rod?
no
What is the starting temperature of the heat source?
100
What is the number of steps to skip between printings?
1
+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 40 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 50 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 13 | 26 | 56 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 11 | 16 | 31 | 60 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 12 | 19 | 35 | 63 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 10 | 13 | 22 | 39 | 66 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 11 | 15 | 24 | 42 | 68 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 12 | 16 | 27 | 44 | 70 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 12 | 18 | 29 | 47 | 71 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 10 | 13 | 19 | 31 | 49 | 72 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 10 | 10 | 10 | 10 | 11 | 14 | 21 | 33 | 50 | 73 | 100 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
a_vitale3@ares:~$ ./OuchThats.out
How long do you want the rod?
10
What is the initial temperature of the rod?
10
How many seconds do you want simulated?
100
Does the heat source start at the left end of the rod?
yes
What is the starting temperature of the heat source?
100
What is the number of steps to skip between printings?
10
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 40 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 73 | 50 | 33 | 21 | 14 | 11 | 10 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 79 | 60 | 44 | 32 | 22 | 16 | 12 | 10 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 81 | 64 | 50 | 37 | 28 | 20 | 15 | 11 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 100 | 82 | 66 | 52 | 40 | 30 | 22 | 16 | 12 | 10 | 10 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
a_vitale3@ares:~$ ./OuchThats.out
How long do you want the rod?
5
What is the initial temperature of the rod?
5
How many seconds do you want simulated?
10
Does the heat source start at the left end of the rod?
no
What is the starting temperature of the heat source?
80
What is the number of steps to skip between printings?
1
+-----+-----+-----+-----+-----+
| 5 | 5 | 5 | 5 | 5 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 5 | 5 | 5 | 30 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 5 | 5 | 13 | 38 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 5 | 7 | 18 | 43 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 5 | 10 | 22 | 47 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 6 | 12 | 26 | 49 | 80 |
+-----+-----+-----+-----+-----+

+-----+-----+-----+-----+-----+
| 5 | 7 | 14 | 29 | 51 | 80 |
+-----+-----+-----+-----+-----+
```

```
+---+---+---+---+---+
| 6 | 8 | 16 | 31 | 53 | 80 |
+---+---+---+---+---+
```

```
+---+---+---+---+---+
| 7 | 10 | 18 | 33 | 54 | 80 |
+---+---+---+---+---+
```

```
+---+---+---+---+---+
| 8 | 11 | 20 | 35 | 55 | 80 |
+---+---+---+---+---+
```

```
+---+---+---+---+---+
| 9 | 13 | 22 | 36 | 56 | 80 |
+---+---+---+---+---+
```

```
+---+---+---+---+---+
| 11 | 14 | 23 | 38 | 57 | 80 |
+---+---+---+---+---+
```

```
a_vitale3@ares:~$ exit
exit
```

Script done on 2023-12-10 00:29:46-06:00 [COMMAND_EXIT_CODE="0"]