

Variables

excess_temp

- a float inputted by the user to calculate a corresponding heat flux

temp, x0, y0, x1, y1

- parameters of the calculate_flux function

slope

- the slope of the line based on the points passed into the calculate_flux function

heat_flux

- a float representing the final heat flux calculated using the boiling curve model and the excess_temp variable provided

$$y = y_0 \left(\frac{x}{x_0} \right)^m, \quad m = \frac{\log(y_1/y_0)}{\log(x_1/x_0)}$$

Sequence of Steps:

1. import math module
2. define function called 'calculate_flux'
 - a. takes in four variables, temp, x0, y0, x1, y1
 - b. calculates slope using formula above
 - c. calculates and returns the heat_flux at temperature 'temp' using the points provided using formula above
3. get excess temperature from the user, convert to float, and assign to excess_temp variable
4. if the temperature inputted is less than 1.3 or greater than 1200
print an error message
5. else, if the temp. is less than or equal to 5
calculate heat flux using the calculate_flux function; pass in points 1 and 2
print message
6. else, if the temp. is less than or equal to 30
calculate heat flux using the calculate_flux function; pass in points 2 and 3
print message
7. else, if the temp. is less than or equal to 120
calculate heat flux using the calculate_flux function; pass in points 3 and 4
print message
8. else, if the temp. is less than or equal to 1200
calculate heat flux using the calculate_flux function; pass in points 4 and 5
print message

Test Cases:

Input	Expected Output	Type
-1	not available	edge
0	not available	edge
1.3	1000	edge
3	3347	typical

5	7000	edge
10	55828	typical
20	445247	typical
30	1500000	edge
80	82797	typical
120	2500	edge
500	316241	typical
1000	1084664	typical
1200	1500000	edge
2000	not available	edge
100000	not available	edge