

HCI Lab Assignment - 4

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Hick Hayman's law:

Demo: <https://akashdeeps19.github.io/hci-lab/lab3/hick.html>

Hick's Law (for William Edmund Hick) or the Hick–Hyman Law (for Ray Hyman), predicts the time it takes to make a decision in selecting among possible choices. The Hick-Hyman Law measures cognitive information capacity. Given n equally probable choices, the average reaction time T required to choose among them is approximately:

$$T = b \cdot \log_2(n+1)$$

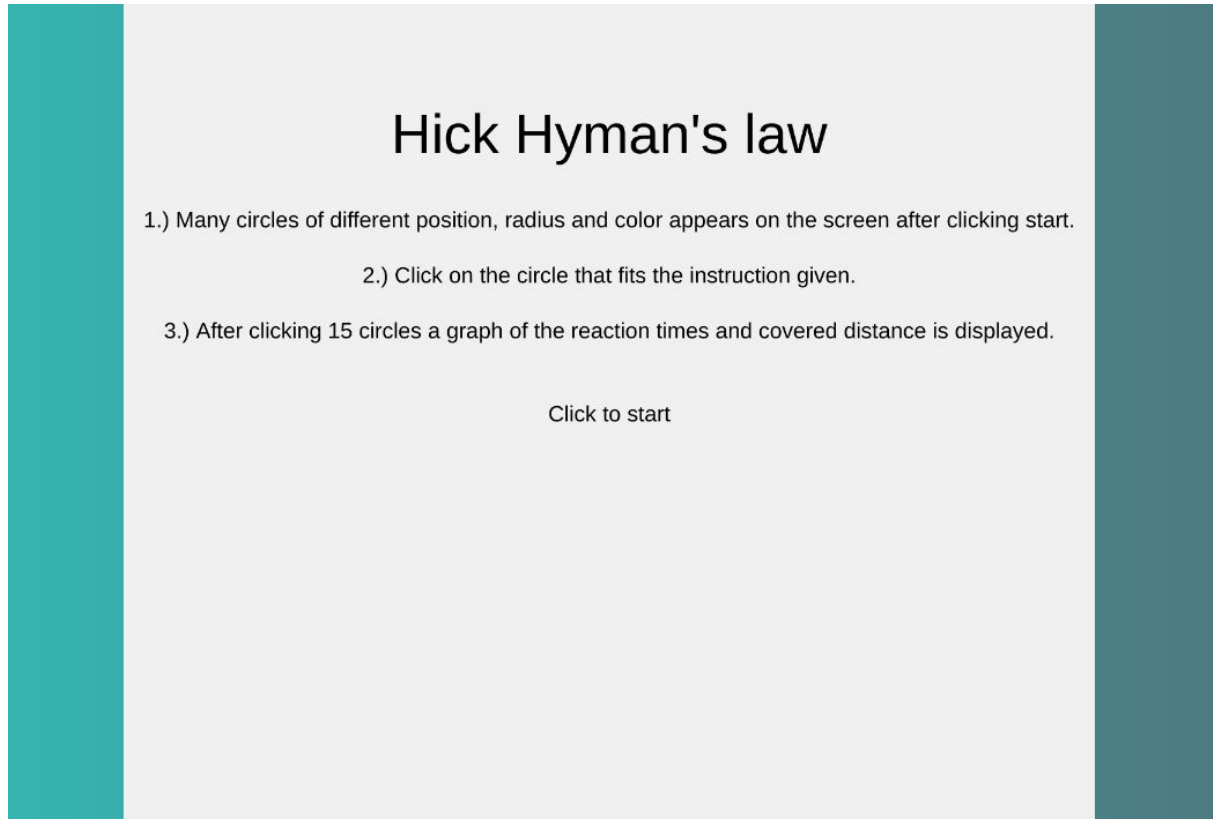
The reaction time curve is logarithmic because for quick search we divide choices into categories, skipping half of the choices at each step instead of considering each choice one-by-one. To find a given command in a randomly ordered menu, scanning each command is essential, requiring linear time, so Hick's law does not apply here. But if the list is ordered we can search and select by subdividing strategy that works in logarithmic time.

Hick's Law is applicable to menu design. It helps in designing menu hierarchy and depth. When we have too many choices (long hierarchy as shown in the screenshot below) we need to cognitively categorize items to reduce the time taken to select an item at any stage. The logarithmic function of Hick's Law decides the depth of hierarchy of the menu tree.

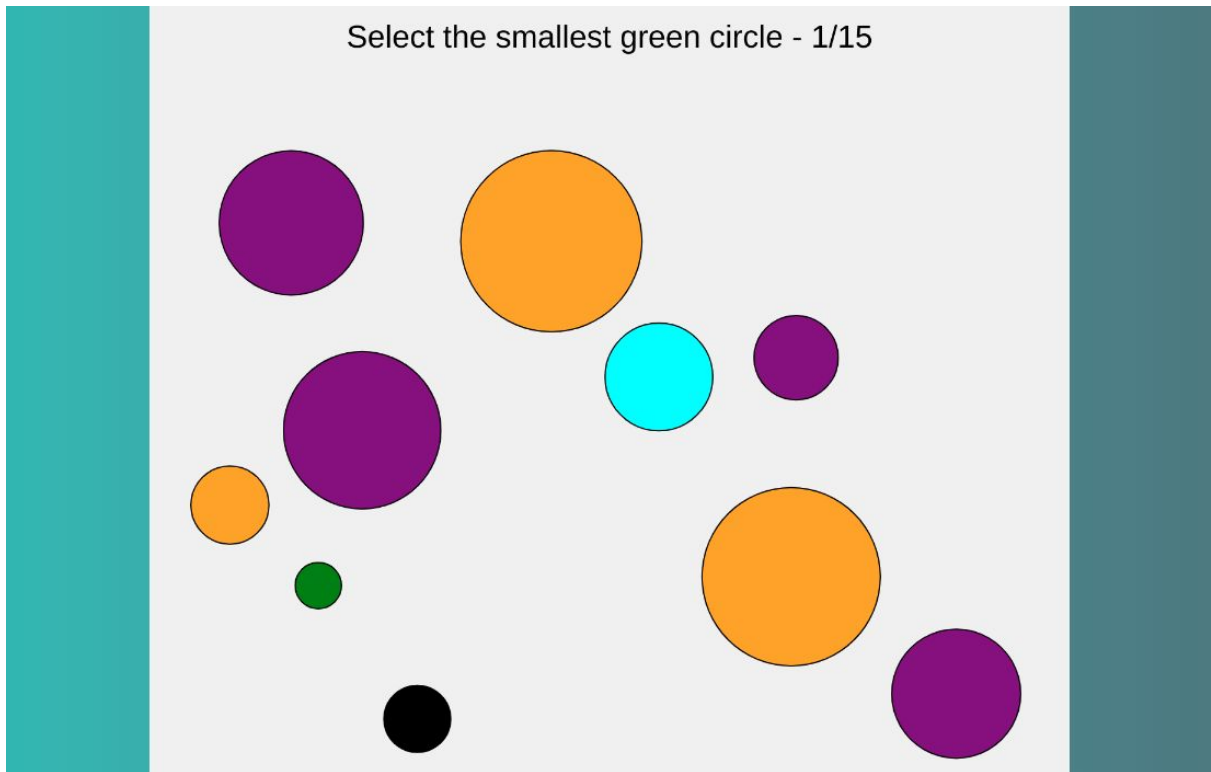
I have developed a simulator to understand the law better. The objectives of this experiment are as follows:

- You will understand how the reaction time to make a choice of the item on a computer screen, depends on the number of options available at that moment.
- You can apply Hick's Law to effectively design, evaluate and test menus of a GUI or a web interface

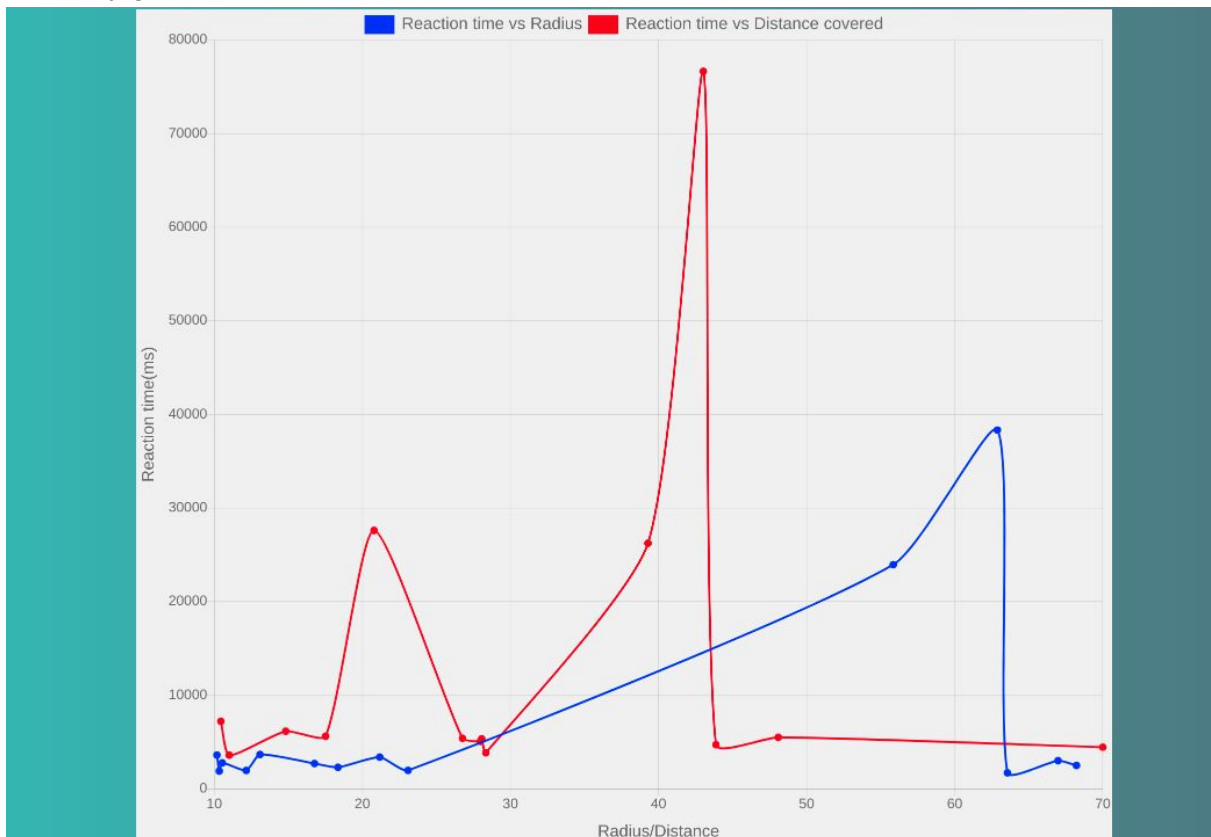
Screenshots:



Instructions page



An instruction is displayed above the canvas. The user has to execute the instruction to move to the next screen. This instruction is randomly generated. The circles are also randomly generated.



The graph of reaction time vs radius and reaction time vs radius is displayed.

Inferences:

- An inverse relationship is seen, that is the inverse relationship between the radius of the element and the response time. Larger elements can be identified with a lower reaction time. Smaller elements require more reaction time from humans,
- A direct relationship between the distance between successive elements and response time is seen. If the distance between 2 successive elements is high, the response time is also high. If the distance is low, the reaction time is low
- There is a direct relationship between the number of UI elements and the reaction times. The greater the number of UI elements greater is the reaction time. When the number of UI elements is low, the reaction time is also low.