**What Previously done in fMRI:**

In a controlled experiment, we observed **17 participants** inside an **fMRI scanner** while they were comprehending short **source-code snippets,** which we contrasted with locating **syntax errors**. We **found** a clear, distinct activation pattern of **five brain regions,** which are related to **working memory,** **attention, and language processing**—all processes that fit well to our understanding of program comprehension.

1. Comprehension task [60 seconds]

2. Rest [30 seconds]

3. Syntax task [30 seconds]

4. Rest [30 seconds]

**Attention:**

Visual perception occurs when the eyes retrieve information from the visual field. The process of choosing “what” to observe is selective. Our eyes do not have enough attention to focus on every object in the field and gather their information; therefore, we need to select what is important to process.

There are many different characteristics to visual selection such as when it occurs and how it occurs. Visual selection can either be **overt or covert.**

Overt selections are generally performed by eye movement. Our eyes will move to locations of interest to retrieve information.

Covert selections are performed by visual attention. Even when our eyes are fixated on one location, we can still shift our attention to observe the different properties of that same location.

One common mistake people make is that the eyes simultaneously process all information in our visual field, but this is not true. There is simply too much information to process. Visual perception occurs over time, and each location and objects in the field are observed in sequence with a combination of eye movements and shifts in visual attention.

There are six different types of eye movement. Each type of movement serves a different function in visual perception.

Below is a list of eye movements, followed by the part of the brain that controls it:

**Physiological Nystagmus –** Not controlled by the brain. They are tremors of the eye muscles.

**Saccades** – controlled by the frontal eye fields in the frontal cortex

**Smooth pursuit movements** – controlled by information from the motor channels in the visual cortext

**Vergence movements** – controlled by visual feedback and occipital cortex

**Vestibular movements** – driven by three-neural reflex arc that begins in the vestibular system

**Optokinetic movements** – controlled by the critical motion pathway and subcortical pathway

Heat maps

Raw data fixation

Sampling rate of