**Suggestions for designing a basic Simon task:**

The Simon task is a so-called “choice reaction task” (as compared to a “simple reaction task” such as a Go/No-Go task). In its most basic form it is a 2x2 design. Let’s suppose the relevant stimulus dimension for making a giving a response is shape: “if you see a circle, press left; if you see a square, press right”. The irrelevant stimulus dimension is location: whether the stimulus appears of the left or right side of the monitor. Thus, there are 2x2=4 combinations: 2(shape: circle, square) x 2 (location: left, right). In a Simon task the irrelevant response dimension (perceiving the S left, right) overlaps with the response dimension (pressing left, right). This makes the Simon task highly suitable to study the interaction between perception & action. The relevant stimulus dimension (perceiving a circle or a square) does not overlap with the response dimension. Please note that the Simon effect occurs at the level of response selection (remember, the Simon task is a choice reaction task): the irrelevant location feature of the stimulus facilitates response selection when the features overlap (as when the circle appears left or the square right) but hinders response selection when the features do not overlap (as when the circle appears right or the square left).

A good design includes a clear instruction of the task (can be oral, can be written) mentioning the stimuli and the mapping rule. Typically, the mapping is counter-balanced, i.e., half of the participants is given the rule: circle-left/square-right (as above) and the other half the reversed rule: circle-right/square-left. That is, there are two separate versions of the task and they are assigned to participants alternately. Also important: Participants are told to be “as fast as possible and as accurate as possible” (they do not need to know, however, that you are measuring their response times and error rates.) Then, the experiment may start. It typically has a short practice session followed by a longer experimental phase. In the practice session some limited amount of trials is administered. After the practice session the participant is asked whether s/he experienced some difficulties and still has any question. If not (which is the usual case), the experimental phase starts. It has the same kind of stimuli as in the practice phase, only many many more. After sifting through some studies, I found that the number of trials varies from 400 – 1200. So, minimum, I would say is that all 4 combinations are (randomly) presented 100 times. Practice trials may be 4x10=40. Of course you may decide for any other number roughly within that range.

That’s the basic design. In addition, it is worth-while thinking about grouping the 400 items into a couple of blocks, so as to be able to track whether, over time, response times (and also error rate) change (e.g., get faster because participants get familiar with the task; or get slower because of boredom or exhaustion) and with it, maybe, the Simon effect. The participant would not really have to recognize these blocks. They may only be “visible” to the experimenter and then used as a factor in the statistical analysis (if it turns out that there is a serial effect). If the total *n* of trials is 400, then there may be 4 blocks à 100 items and there may be 25 trials of each of the 4 combinations, respectively.

Once you have obtained the raw data (response times and errors) there is a procedure how to “clean” the data, i.e., get rid of outliers, exclude error trials, exclude participants (e.g., for being too slow, as compared to the others, or for having more than 20% errors…) I can explain the data cleaning procedure to you in more detail later.

Good luck with implementing this basic Simon task.

**Caution**: There are some on-line “Simon tasks” which are NOT actually Simon tasks. I found the following one:

<https://www.psytoolkit.org/experiment-library/simon.html>

It uses the words “left” and “right” as stimuli. The rule is: if you see “left”, press left; if you see “right”, press right. “Right” and “left” can appear right and left. It looks very “Simon” at first glance but it actually NOT a proper Simon task (but another type of task (Hedge & )). The reason is that in a Simon task the relevant stimulus dimension (on which the rule is specified) MUST NOT overlap with the response dimension (pressing left or right) (Only the irrelevant stimulus dimension overlaps with it). Rather, the relevant S dimension has to be completely orthogonal, e.g., a shape is not inherently related to a particular side. In the example, however, the MEANING “left” and “right” DOES overlap with the left and right response. This is an undesired confound which is to be avoided. [Note also that this version cannot be counter-balanced: you cannot say: if you see “left” press right/if you see “right” press left, without changing the task dramatically.]

**Reading suggestion:**

Hommel (2001) gives a good overview over more than 40 years of using the Simon task in psychological research. He also compares it with related but different tasks all belonging to the family of “dimensional overlap” tasks, most notably the Stroop task and the Eriksen Flanker task.

Hommel, Bernhard (2011). The Simon effect as tool and heuristic. *Acta Psychologica,* *136*, 189-202.