

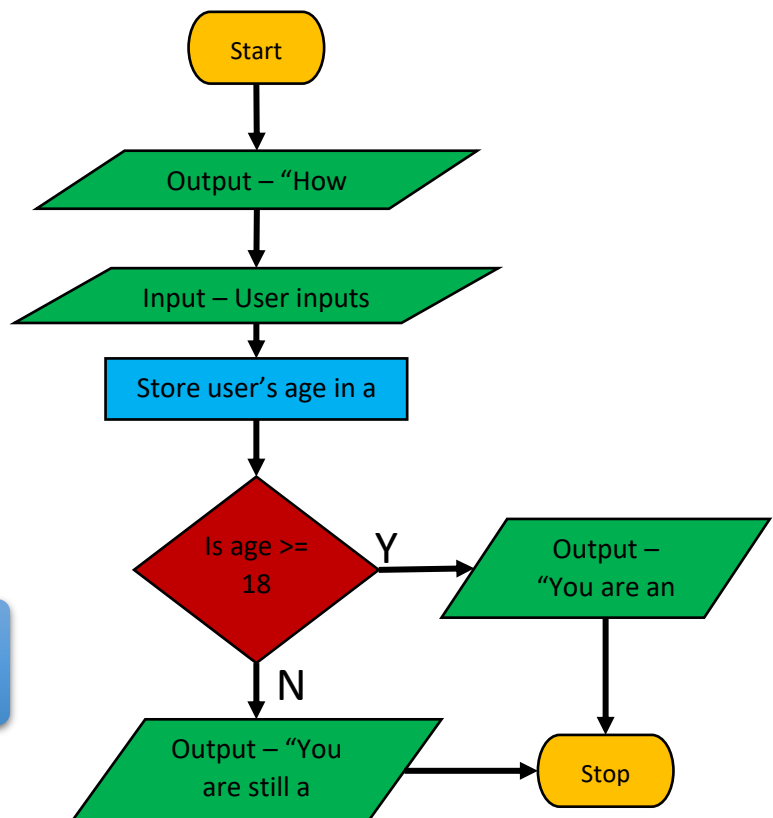
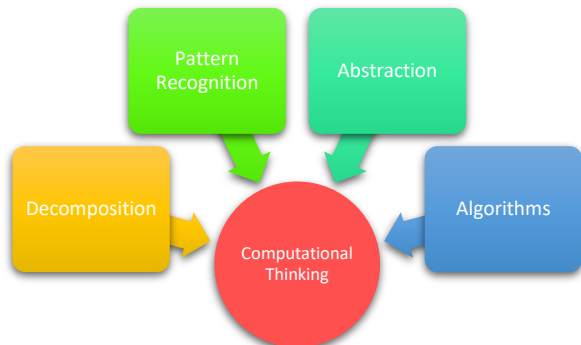
COMPUTATIONAL THINKING

Computational Thinking refers to the processes/approaches which are used to formulate a problem in a manner such that a computer can be used to solve it.

Elements of Computational Thinking:

1. **Decomposition:** Breaking down a big problem in smaller chunks.
2. **Pattern Recognition:** Recognising similarities amongst and within the smaller chunks.
3. **Pattern generalisation & abstraction:** Putting a pattern in its simplest terms and creating a piece which can be used whenever needed. Abstraction means focusing on important information and ignoring irrelevant detail.
4. **Algorithm design:** Stepwise solution to a problem where the above elements are used when deemed necessary.

An algorithm is essentially a detailed step by step plan to solve a problem. It is often the starting point for generating computer code. An algorithm is composed of detailed instructions, arranged in the order in which they are to be carried out. A visual method of depicting algorithms are flowcharts. A flowchart is a type of diagram that depicts step by step instructions or a process, where various kinds of boxes represent the steps, and these are connected by arrows to show their order.



All mentors are:

1. Expected to be aware and translate the following to their audience:
 - Explain elements, use and exercise producing algorithms and flowcharts.
 - Divide the audience in teams and work with them.
 - Identify social/geographical/cultural based problems of the audience and brainstorm.
 - Logical thinking – how to think stepwise and process oriented.
 - Debugging logic and algorithm.
2. Suggested to:
 - Understand the limitations of pattern recognition (because humans always look for patterns which may misguide us).
 - Have a basic understanding of the 'Chaos theory' where slight change in initial conditions can completely change the output.
 - Activate discussions on what are algorithms and flowcharts.
 - Use props, ATL material, art, craft & stationery material and document the process with pictures, videos, interviews of the audience, etc.

References:

The following is a non-exhaustive and suggestive list of resources on the concept of design thinking:

Resource Description	
Introduction to Computational Thinking - BBC	Link
Computational Thinking – Wikipedia	Link
What is Computational Thinking? – Google	Link
What is Computational Thinking? – Harvard	Link
How to teach Computational Thinking?	Link
Computational thinking: A digital age skill for everyone	Link
What’s an Algorithm?	Link 1 Link 2
Flowcharts – Wikipedia	Link
An Overview of Flowchart	Link
What is a Flowchart?	Link
Computational Thinking: What is it? How should it be taught?	Link
Problem Solving Technique: Flowcharts	Link

Note:

1. Mentors are recommended to build their content and not plagiarize and then deliver to their audience in the ATLS.
2. Mentors are encouraged to explore resources and share critical observations within communities and with AIM.
3. Please note that these are third party links and AIM or NITI Aayog does not endorse any person(s) or organization(s) mentioned on or related to these links.
4. The opinions and views expressed by the mentors during their interaction are of their own and do not necessarily reflect the views of AIM or NITI Aayog.
5. Mentors are aware that the engagement with the ATLS is treated as a community service and there shall be no financial transactions between any stakeholder and mentor for any official ATL related activity.