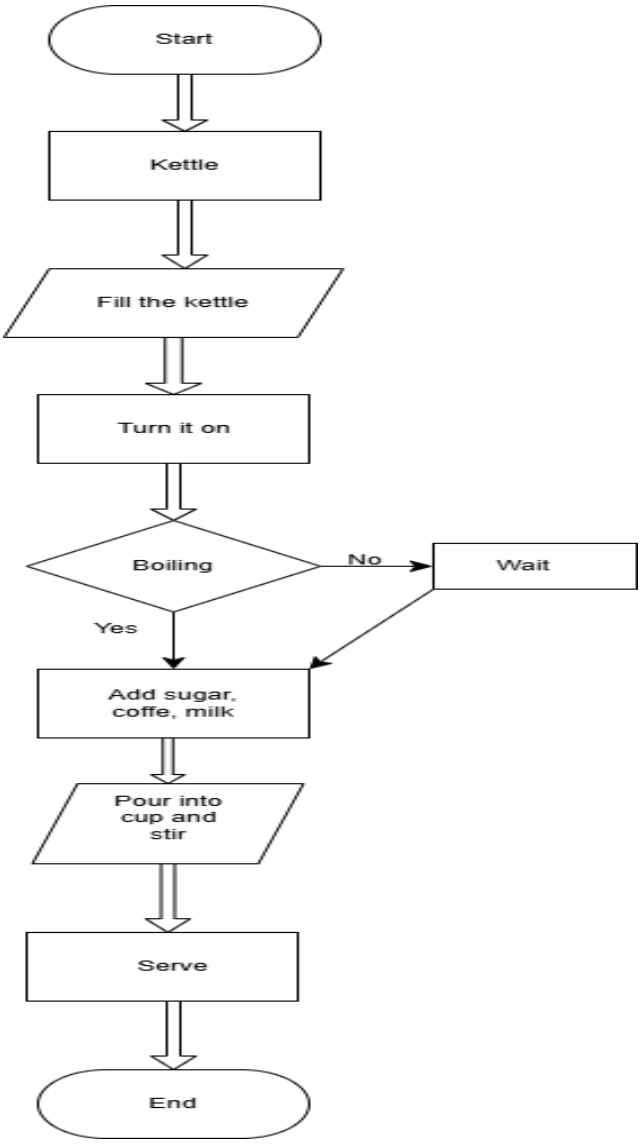
Introduction to Computer Science

How Computers Think: My Illustrated Notes

Section 01 : Algorithm in Everyday life

Algorithm of making Coffee:

1) Take a kettle
2) Pour water
3) Turn it on
4) Add sugar & coffee
5) mix milk
6) Pour it into cup and stir
7) Serve



Section 02: Debugging by hand

Multiply without operator

```
start
multiply (x,y)
 if y<0
   return multiply (x, -y)
 or y==0
     return 0
  else
    return multiply x + multiply(x, y-1)
 end
```

Corrected Version

```
start
multiply (x,y)
if y<0 then
   return –multiply(x, -y)
else if y==0
   return 0
else
   return multiply x + (x, y-1)
end
```

Note : when y<0, y is already negative, -y makes it positive which is incorrect;

“or” word is incorrect; after if condition, then is missing;

Section 03: Data and Representation

A digital clock

Data types :

It uses

integers : hours, minutes, seconds

booleans : AM/PM

string : ("09:17 PM")

Data structure :

arrays, list : hour, second, AM/PM etc.

A list containing all the data together in order. It's represent updated data

Clock pseudocode:

```
start
int
   current time (hours, minutes, seconds)
if time < 12 hour
   print time, AM
else
    print time, PM
end
```

Section 04: Computational Thinking Reflection:

My morning routine when I was in school:

1. Decomposition –

- Get up from bed
- Brush the teeth
- Take shower
- Get dressed
- Eat breakfast
- Pack school bag
- Went to the school

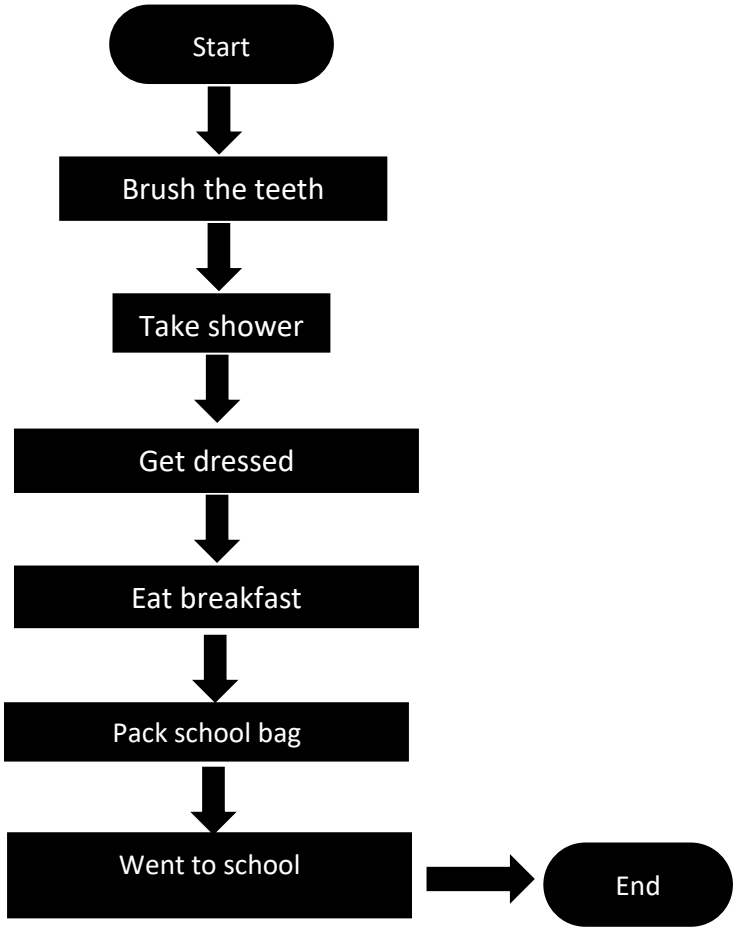
2. Pattern Recognition –

- Brushing before breakfast
- Get dressed after shower
- Pack school bag after breakfast

3. Abstraction –

- Timing is important
- Take water before going to school
- Check the class schedule

4. Algorithm Design



Section 05: Code Ethics Mini-Essay

Privacy

Protecting user privacy is a fundamental right in the age of the internet. When we use any internet-based service or website, the service provider must request permission before collecting or using our personal information. It is also their ethical responsibility to secure that data and ensure confidentiality. Unfortunately, there are individuals or companies that overlook this responsibility for financial gains, selling or sharing user data without permission. Such activity not only violates privacy but also undermines public trust in technology. For instance, ***The New York Times*** April 2020 article accusing Zoom involved in undisclosed data mining during user conversation. The incident demonstrates how private information can be exploited when there is a lack of moral principles. As future developers, we have a responsibility to design systems that respect consent, utilize encryption, and are transparent. Protecting user data is never something that should be optional—it is a primary ingredient of ethical computing.