visual programming

Solution Modeling

Bachelor of Information Systems
Institut Teknologi Del

Learning Objective(s)

This material should address the following question(s).

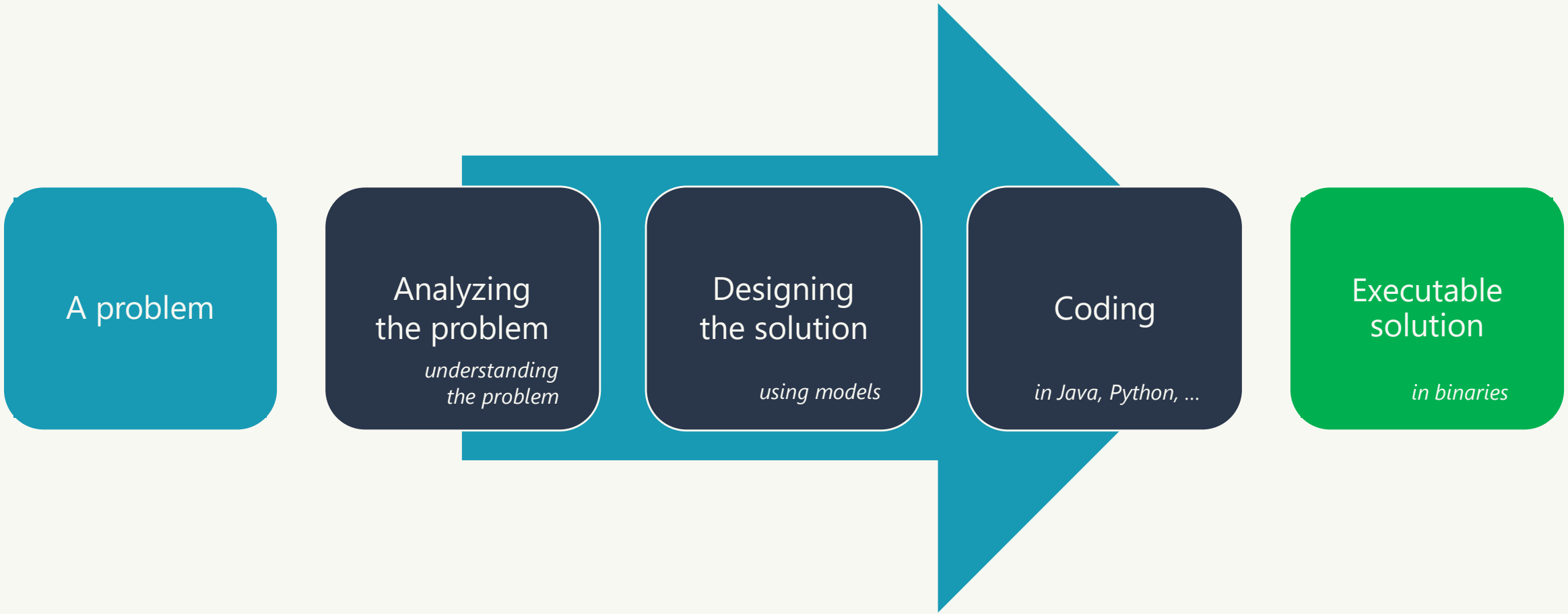
- How to express a solution?
- Is visual modeling a good option to express a solution?

Discussion Point

Expressing A Solution.

Problem Requires Solution

Solution Development



Challenges for beginners

- Freshmen find programming, coding in particular, is **difficult**.
  - Even for students from computing major.

What makes coding difficult?

- Difficulty in understanding logic.
- Complicated programming language.
  - Boilerplate codes.
  - Rules & conventions.
- Paradigm.
- Documentation.
- Examples.

How can we **express** out solution without the actual coding? Or at least, delay it for later.

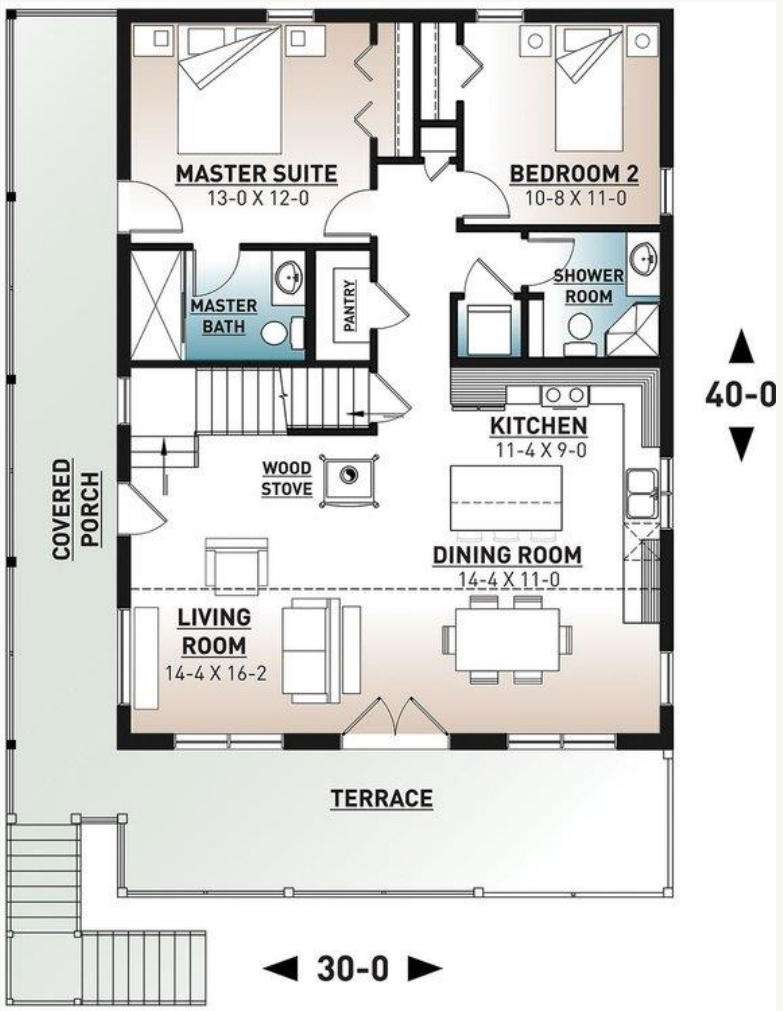
Discussion Point

Expressing A Solution:
Modeling.

Modeling

- A model is an **abstraction** of an activity or an artifact.
  - It temporarily omits irrelevant aspects from our view.
  - **Modeling** is the process of building a model.
    - Modeling language.

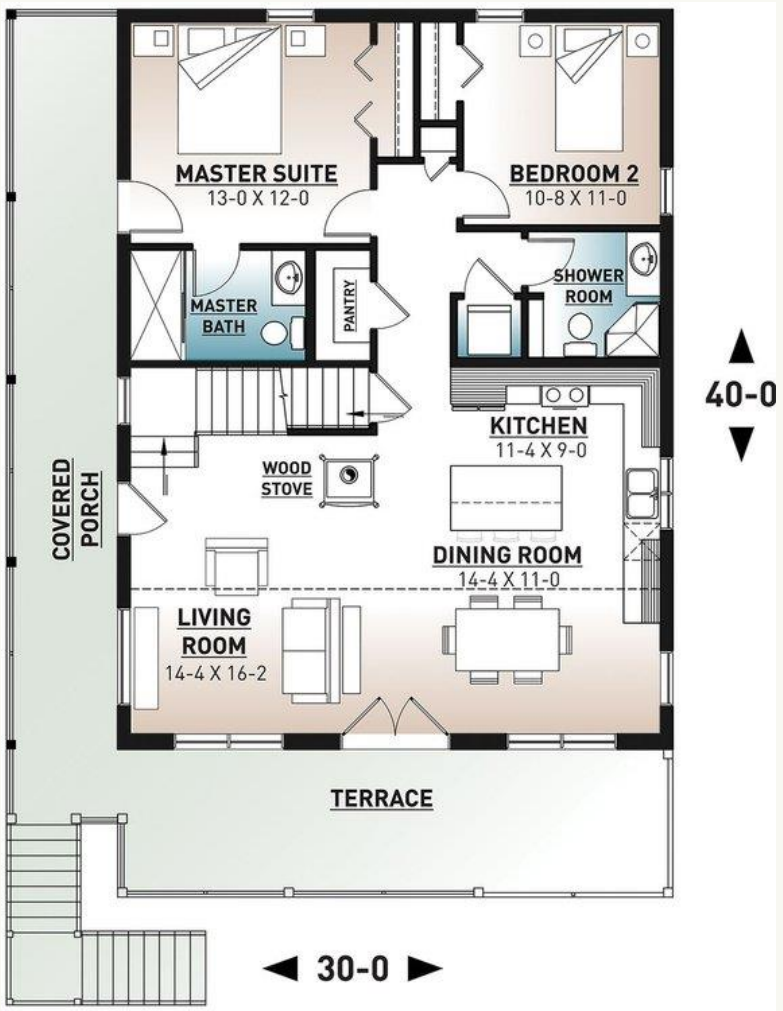
- In programming:
  - Pseudocode (like codes).
  - Diagrams (visual objects).



Floor plan
https://cdn.houseplansservices.com/

Modeling

- Advantages of modeling:
  - Could find **patterns** on similar solutions.
  - Could find points of **improvement**.
  - Could conduct **testing** before materializing it.



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Discussion Point

Pseudocode vs. **Diagrams**

Challenge

- Smallest number finder.
  - There are three arbitrary numbers, say x, y, and z.
  - How to determine which number is the smallest one?

x, y, z?

Challenge

- One possible solution:
  - 1st: compare the first two numbers to find the smallest.
  - 2nd: compare the outcome of the 1st step to z.

x, y, z?

```
PROGRAM: Smallest Number Finder
This program accepts three numbers and returns the smallest between the three.

DECLARATION:
x, y, z : integer          {the inputs given by the user}
s       : integer          {where the the output will be stored}

ALGORITHM:
  x := read user input     {reading the user input}
  y := read user input     {reading the user input}
  z := read user input     {reading the user input}

  if(x < y)                {when the value of x is less than the value of y}
    s := x                 {set s with the value of x}
  else                     {when the value of x is NOT less than the value of y}
    s := y                 {set s with the value of y}
  endif                    {end the comparison}

  if(z < s)                {when the value of z is less than the value of s}
    s := z                 {set s with the value of x}
  endif                    {end the comparison}

  return(s)                {return s as the final result}
```

Pseudocode

Flowchart

```
PROGRAM: Smallest Number Finder
This program accepts three numbers and returns the smallest between the three.

DECLARATION:
x, y, z : integer          {the inputs given by the user}
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    s := y                 {set s with the value of y}
  endif                    {end the comparison}

  if(z < s)                {when the value of z is less than the value of s}
    s := z                 {set s with the value of x}
  endif                    {end the comparison}

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```
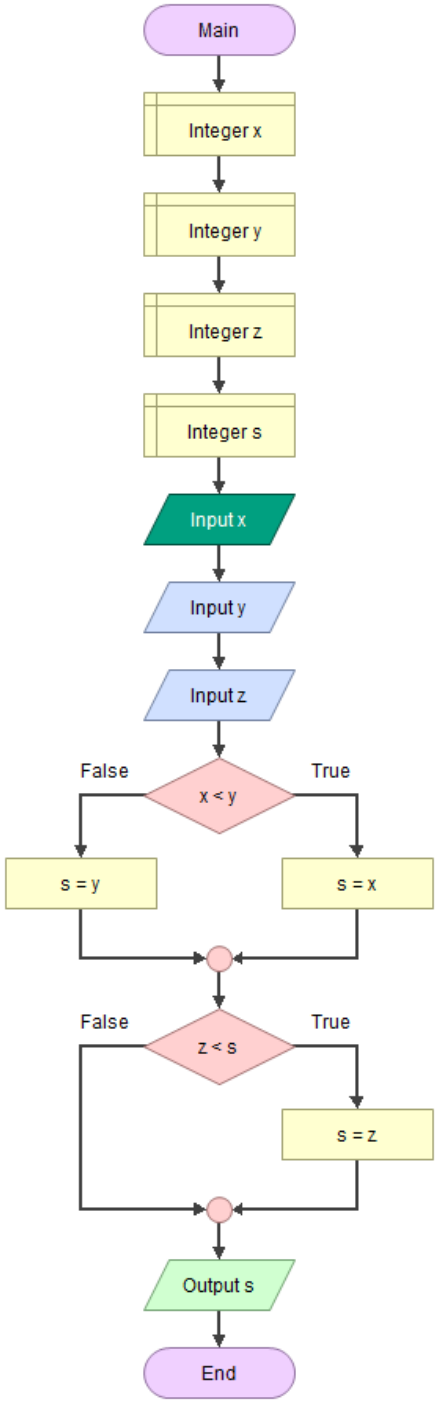
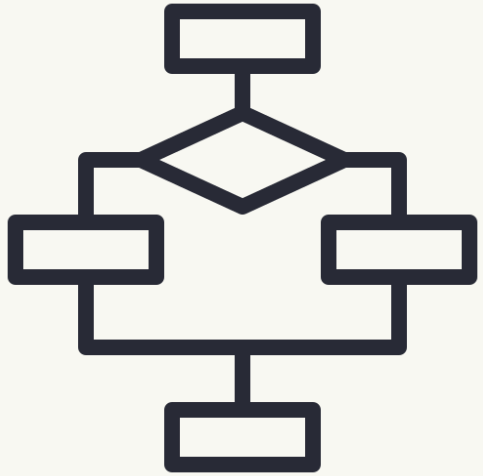

Pseudocode



Modeling with Visual Objects

- Advantages:
  - Intuitive.
  - Easier to understand.
  - Less to no boilerplate code.
  - Focus on the solution.
  - Fit for beginner.

- Disadvantages:
  - Not suitable to draw complex and large solutions.



Final **Thoughts.**

Conclusion

1. Solutions are expressed in codes written in a specific programing language.
   - Later, the code will be translated into machine language.
   - Writing code could be hard, especially for beginners (freshmen).
2. Modeling could help us focus on the solution.
   - Pseudocode vs. diagram (visual objects).

References

Wassberg, J. (2020). Computer Programming for Absolute Beginners. Packt.

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