

# BMI Calculator Program

Using Computational Thinking Process to Plan and Write a Program

**Goal:** write a program that asks the user for the necessary information and tells them their BMI (Body Mass Index)

**Action steps:**

1. Develop a plan using the Computational Thinking process
2. Write the code based on the plan
3. Test and refine

# DECOMPOSE

\*\*\* break into major/top level steps or actions \*\*\*

1. Display welcome/intro message
2. Collect weight (lb)
3. Collect height (in)
4. Calculate BMI
5. Display BMI

# PATTERN RECOGNITION

\*\*\* Do I see repetition? See patterns? Seen or done any of these steps/actions before? What do I NOT know how to do? \*\*\*

1. Display welcome/intro message
2. Collect weight (lb)
3. Collect height (in)
4. Calculate BMI
5. Display BMI

Repetition?

- Yes, I am collecting similar info (numeric/double) from the user twice.

Patterns?

- No not particularly.

Seen or done any of these steps before?

- I know how to display info on the screen.

What do I NOT know how to do?

- Collect info from the user (need to research ... Scanners!)
- BMI formula (need to research ...  $(703 * \text{weight}) / (\text{height}^2)$  )

# REPEAT ABOVE UNTIL HAVE THINGS BROKEN DOWN TO BASIC STEPS

\*\*\* take each decomposed step one-at-a-time and decompose/pattern recog it \*\*\*

1. Display welcome/intro message
  - Know how to do this, it is already a simple step: `println()`
2. Collect weight (lb)
3. Collect height (in)
  - These two actions are similar and can be solved/handled in the same way
  - Involves multiple steps – decompose further:
    1. Prompt the user telling them what we want them to enter
      - `Print()` ...not `println()` because we want the cursor to remain after the prompt
    2. Get the answer from the user as a double
      - `Scanner getDouble()`
  - Abstract this into a parameterized method
    - Need to know the prompt (string parameter)
    - Will return/give back the answer as a double
4. Calculate BMI
  - Use formula:  $(703 * \text{weight}) / (\text{height} * \text{height})$
  - Abstract this into a parameterized method
    - Need to know the weight and height (both double parameters)
    - Will return/give back the answer as a double
5. Display BMI
  - `Println()`

# ABSTRACTION

\*\*\* generalize and simplify ... write pseudo code \*\*\*

- Generalize and simplify ... retain/reflect the structure of the problem... ***follow our decomposed steps***
- What methods do we have/need?
  1. main()
  2. a parameterized method to prompt the user, collect, and return a double value ... call it `getDouble(String prompt)`
  3. a parameterized method to calculate and return the BMI ... call it `calcBMI(double weight, double height)`
- main()
  - Display welcome/intro message
  - Collect weight (lb)
  - Collect height (in)
  - Calculate BMI
  - Display BMI

```
println("BMI Calculator");  
double weight = getDouble("Enter your weight (lb): ");  
double height = getDouble("Enter your height (in): ");  
double bmi = calcBMI(weight, height);  
println("BMI: " + bmi);
```
- `getDouble(String prompt)`
  - `print(prompt);`
  - ...hmmm gonna need a scanner to get keyboard input from the user ... make it a class variable and init in `main()`
  - `return Scanner.getDouble();`
- `calcBMI(double weight, double height)`
  - `return (703 * weight) / (height * height);`