

Algorithms

The solution to any computing problem involves executing a series of actions in a specific order. A **procedure** for solving a problem in terms of

1. the **actions** to be executed, and
2. the **order** in which these actions are to be executed

is called an **algorithm**.

Body mass Index (BMI)

Step 1 of algo

$$\frac{W}{L * L}$$

- Accept person weight as W
- Accept person Height as L
- Calculate $\frac{W}{L^2} \Rightarrow \underline{\underline{BMI}}$
- print BMI

Algorithm

Algorithm in Real Life

Consider the following ...

Problem: Making a cup of tea

How to solve:

- ✓ 1. Start
2. Fill kettle with water and boil.
3. Pour hot water into cup
4. Put teabag in
5. Add sugar
6. Stir with spoon
7. Take out teabag
8. End

↓ Algorithm

(Target-Heart-Rate Calculator) While exercising, you can use a heart-rate monitor to see that your heart rate stays within a safe range suggested by your trainers and doctors. According to the American Heart Association (AHA), the formula for calculating your maximum heart rate in beats per minute is 220 minus your age in years. Your target heart rate is a range that's 50–85% of your maximum heart rate. [Note: These formulas are estimates provided by the AHA. Maximum and target heart rates may vary based on the health, fitness and gender of the individual. *Always consult a physician or qualified health care professional before beginning or modifying an exercise program.*] Create a program that reads the user's birthday and the current day (each consisting of the month, day and year). Your program should calculate and display the person's age (in years), the person's maximum heart rate and the person's target-heart-rate range.

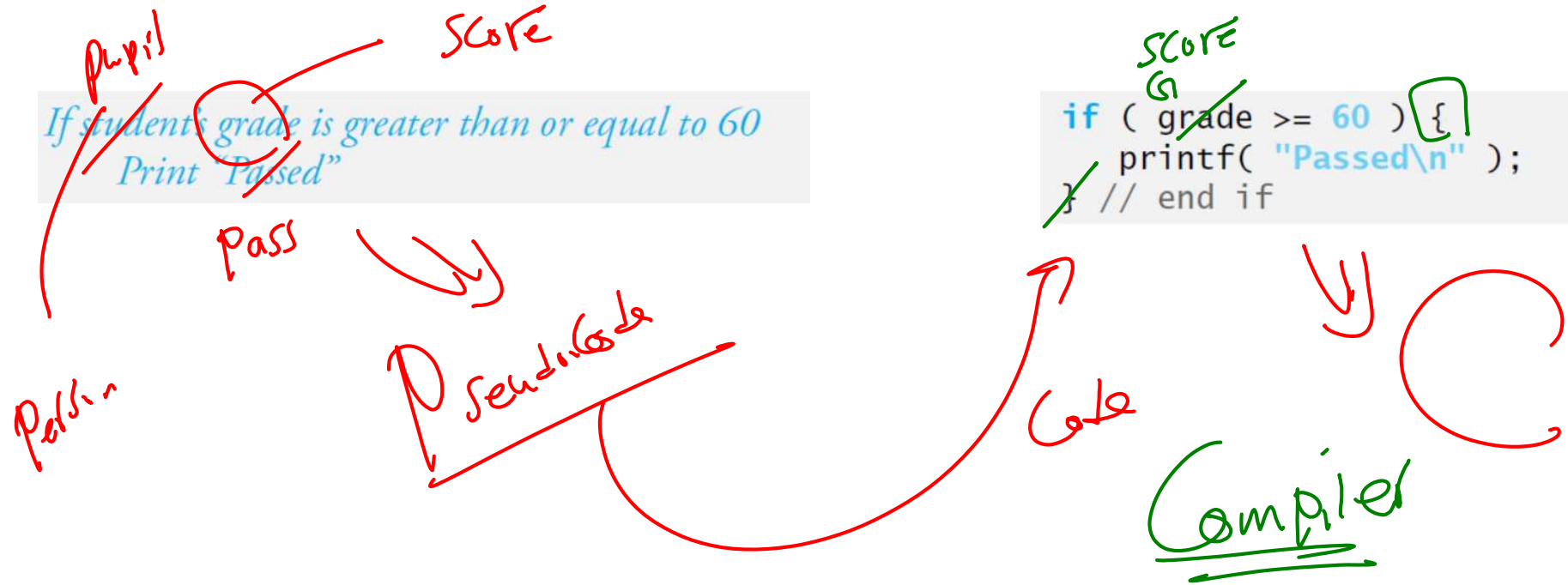
1. input your age $\rightarrow$ X
 2. Calculate $22 - X \Rightarrow$ 4
 3. Calculate $0.5 * 4 = M$
 4. Calculate $0.85 * 4 \Rightarrow u$
 5. print Range from M to u
- Range

Pseudocode

- An artificial and informal language that helps you develop algorithms
- Pseudocode is similar to everyday English; it's convenient and user friendly although it's not an actual computer programming language
- Pseudocode programs are not executed on computers. Rather, they merely help you "think out" a program before attempting to write it in a programming language like Java

*If student's grade is greater than or equal to 60
Print "Passed"*

```
if ( grade >= 60 ) {  
    printf( "Passed\n" );  
} // end if
```



Problem: Adding two numbers A and B.

Pseudocode:

- ✓ 1. Start
- ✓ 2. Input A and B
- ✓ 3. Total = A+B
- ✓ 4. Print Total
- ✓ 5. End

Algorithms

Pseudocode

graphical

Flowchart

UML