APS145
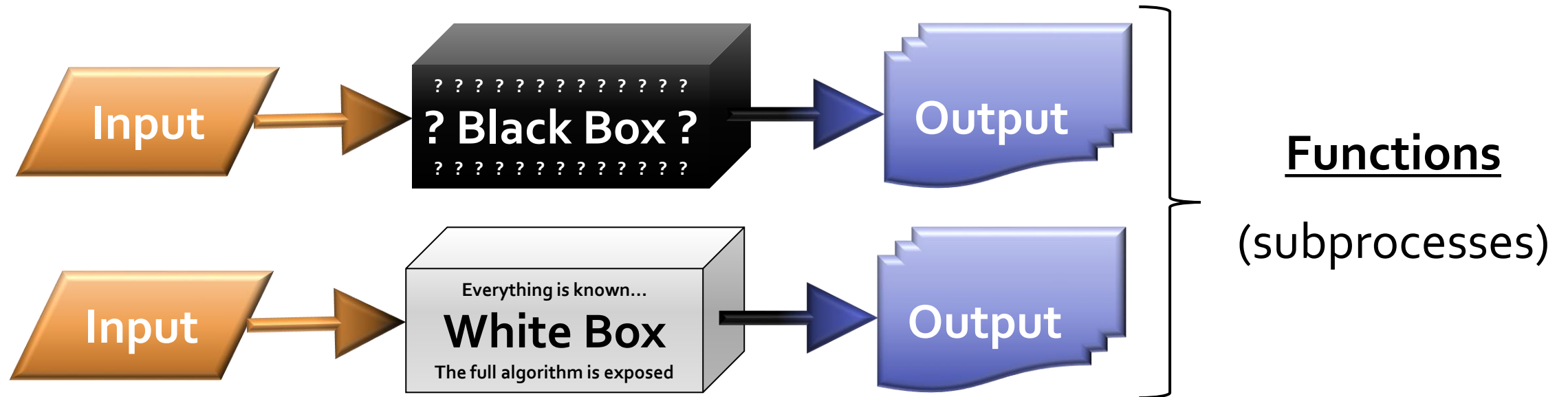# Applied Problem Solving & Computational Thinking

Workshop #8 - Supplemental

Black & White Boxes

- **INPUT** is provided to a process

- The process (**BLACK|WHITE BOX**) uses the input in some way

- **OUTPUT** is generated

Grocery Self-Checkout

- **Grocery self-checkout**
  - Line where you scan/weigh/enter your own items into the system
  - Bag your own items
  - Pay for your purchase

https://sintelsystems.com/wp/wp-content/uploads/2018/08/self-checkout-kiosk-Ralphs-1024x576.jpg

Non-Perishable Items…

- **<u>Non-perishable</u>** (White Box)
  - These items have barcodes
  - Items can be scanned
  - <u>Examples</u>: Canned goods, Packaged goods, Cartons, etc.

- **<u>Available Black Box</u>**
  - *<u>Data lookup</u>* for product info.

Perishable Items...

- **Perishable** items (White Box)

- Require more user input as these items <u>don't have a barcode</u>

    - **Case-1: By Weight**
        - Might require "weighing" as they are <u>priced by weight ($/kg)</u>
        - Place item on weigh-scale and system will read the weight
        - <u>Examples</u>: Apples, Peaches, Banana's

    - **Case-2: By Quantity**
        - Might require "quantity" input as these items are <u>priced by # of units</u>
        - <u>Examples</u>: Peppers, Broccoli, Cauliflower

https://s.yimg.com/uu/api/res/1.2/AP.bZIUJfFF05zLYQ9x8rA---B/aDoyODMyO3c9NDI1NjtzbToxO2FwcGlkPXloYWNoZW9uYW9zcg--/http://media.zenfs.com/en-US/homerun/money_403/f6ed613c196b75ab1942afb470f1c408

Available Black Boxes
- Weigh Item (scale)
- Fetch Products by Category
- Data lookup for product info.

Logic-1

- Describes the <u>White Box</u> process for checking out a **non-perishable** barcoded item **(taxed)**
- Exactly <u>HOW</u> **should** this process work?
- Include what should happen if an item **can't be scanned** or **isn't found in the product database** after scanning – exactly **how should the application handle this**?

- **Available Black Box**
  - *Data lookup* for product info.

Your Tasks [Logic-2]

Logic-2

- Describes the <u>White Box</u> process for checking out a **perishable** item (**not taxed**)
  - Exactly <u>HOW</u> **should** this process work?
  - Need to provide the customer a way to locate the matching item in the product database – <u>HOW</u> exactly **should** this work?
  - Remember, a product will be **1** of the following cases:
    - **By-weight** (price is determined based on cost/weight)
    - **By-quantity** (price is determined based on unit cost)

- ## **Available Black Boxes**

  - Weigh Item (scale)
  - Fetch Products by Category
  - Data lookup for product info.

Logic-3

- Describes the <u>White Box</u> **Payment** process:
  - Receives a list of perishable and non-perishable items (assumed to have been done in previous logic parts)
  - Must <u>loop</u> each item to determine tax/not-taxed etc.
  - Itemized receipt must be generated (**indicate perishable items from non-perishable**)
  - Must contain logic for determining sub-total, taxes, and total
  - Will **call sub-processes as required** for 3rd party payment system

- **Available Black Box**
  - Process Payment (based on payment method)

Your Tasks: Final Solution

Group Solution

- Assemble all parts as required to complete a full solution of the self-checkout process

- Refine the solution with your peer group members so it flows as expected

- Make sure **data structure representation** and **variables** are consistent

- Provide a "main" process