# [Problem Solving] VENDING MACHINE

**Rules of the Game**

1. You are free to choose your best language and IDE (Development Environment) as per your choice.
2. We are particularly interested in understanding your craft on how you design your solution. Your code enables us to know about your ability to code. So the key things we are interested are:
    - The final code should compile and run successfully.
    - All corner cases should be handled.
    - The code is modular with clear interfaces identified and coded.
    - Proper use of abstractions and clean production ready code.
    - Code can be extended for features addition.

## Problem Definition

I own a vending machine that can hold up to a total of 'N' food items which could be a max of ‘M’ type at any given point in time. Each slot is given a number starting at 1 increasing with increasing distance from the dispensing point in steps of one. I want to create an automated vending system that allows me to manage my machine without human intervention.

To prepare the machine for use we need to fill it with consumables. Each type of consumable from ‘M’ costs the same amount of money and we only take currency in exact amounts(we assume customers are nice enough to have the exact amount in hand). The order we maintain to fill the food items will be the order vending machines can dispense them(users cannot request items in random order). For example, if the sequence of items inserted into the machine is A, B, C, D then it can only dispense the food items in order A, B, C, … so if a customer wants to order C and not A & B, it is

mandatory to charge for A + B + C and dispense all 3 items. Whenever such requests are initiated, machine **need to perform few minimum actions:**

1. Checking availability of items
2. Verifying amount of cash provided
3. Dispensing all the items to the vending point

## Valid assumptions

1. Slot index starts at 1
2. When an item is dispensed, items after the requested item are shifted to 1 so slot index gets reset to after every interaction.
3. A transaction has 2 user inputs
    a. Slot index
    b. Amount of money provided

I have been a fan of IOT for a long time and wanted to manage this from the comfort of my home. I **need the ability to find out:**

1. Current number of items available
2. Total cash machine has earned so far

## Scope

We interact with the system via a simple set of commands which produce a specific output. Please take a look at the example below, which includes all the commands you need to support - they're self explanatory. The system should accept a filename as a parameter at the command prompt and read the commands from that file

**Example: Input File *(contents of file):***

```
init_machine 5
insert A 10
insert B 20
insert B 20
insert D 5
insert D 5
```

```
insert C 30
get 2 pay 30
get 1 pay 10
get 1 pay 20
get 10
status
```

**Output *(to STDOUT):***

```
Initialized machine with capacity 5
Inserted item at 1 A for 10
Inserted item at 2 B for 20
Inserted item at 3 B for 20
Inserted item at 4 D for 5
Inserted item at 5 D for 5
Insufficient space
Dispensing A B
Insufficient amount for B
Dispensing B
Item not available
Available 2
Can earn 10
Has earned 50
```

**Explanation:**

- 1st: First command initialized the machine with 5 capacity
- 2nd-6th: subsequent commands inserts item of type with their price
- 7th: command will fail as it exceeds the machine capacity
- 8th: User requests slot 2 to dispense so the machine will charge for 1st item + 2nd item that is A + B, dispense them and shift remaining items back to slot 1.
- 9th: User requests slot 1 that costs 20 but provided only 10, transaction fails
- 10th: User requests slot 1 with the correct amount, machine will charge for 1st item that is B, dispense it and shift the remaining slot.
- 11th: User requests a slot is not available at that moment

- 12th: Prints the required details of the machine at that moment

## Problem Extension

1. Requesting top 3 type of products that are most requested