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| Project Name & Concept: | School Supplies Online Store |
| Number Conversion | When user enters a store, he get’s asked if he would like to to convert US dollars to bitcoins. Ne number conversion converts decimal to binary |
| Prime Numbers/Cipher | I will use to cipher to encrypt , decrypt user’s password.  Using Fibonnachi sequence as a cipher. This will implement recursion as well. Each letter in the alphabet corresponds to the Fibonacchi number |
| Set Theory | Items in the Inventory of the online store will be stored in a set. Some categories are stored in the dictionary and some are stored in the sets.  The shopping cart is a set as well.  After the customer adds the item to his cart, he will be adding them to the new set.  Set unions implemented in categories “All Stationary”, “All Electronics”.  Set intersections implemented in showing the customer the items that are in electronics besides the laptops. So *otherElectronics* is a intersection of all electronics and laptops.  I also added the the union of dictionaries.  Please see Data.py for set operations |
| Permutations/Combinations | **Combinations:** Printing combinations of other items that can be an add-on to the current item in the cart (or if no cart, the item user is going to purchase).  *“Users also bought:*  *{pen, erasor},*  *{erasor, pencil sharpener},*  *{notebook, pen, eraser, sharpener}”*  **Permutations:** Used to help the user generate a possible user name.  Program asks for the users first, last names and his favourite super hero and creates all possible permutations of words that will compose a user name.  Than a customer can choose one and the username will be created based on that permutation with adding some random numbers in between the words  For example, the user enters *Iryna Sherepot Supermario*, the program will print the following permutations:  *Your possible usernames are:*  *1. { Iryna Sherepot Supermario }*  *2. { Iryna Supermario Sherepot }*  *3. { Sherepot Supermario Iryna }*  *4. { Super Mario Iryna Sherepot }*  *5. { Super Mario Sherepot Iryna }*  *Please enter your choice:* |
| Probability | Little lottery: If a customer purchases pencil sharpener(or any item), he gets a surprise random item added for free. He enter swhat item he would like the most, and the program will calculate the probability of him getting one. The probability will be different for each item, as the store will have different amounts of different items and some quantities as 0. |
| Algorithms | Customer can sort inventory by price . Binary search Tree traversal used to print a sort by price of the inventory. |
| Recursion | Recursion is used to compute factorials while computing the probability of the items being chosen  Also recursion is used to populate the BST of merchandise.  Also recursion is used in creating the Fibonacci numbers array to use in the cipher |
| Trees | Creates a BST based by price of items. First thing that the program will print right after saying *Welcome to the store* |
| Finite State Machine | The program would show different states that the customer is on the website. For example when he/she didn’t add anything to the cart – one state, when added an item – different state, when paid – another different state |