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Harnoor Khehra Tutorial T04

Assignment 2 – Exercise 4 WRITEUP:

For this writeup we will be analyzing the following code:

```
        for (int i = 1; i < dictionary.length; i++) {

            TupleGenerator currentitem = dictionary[i];
            double nextShoeDiscountedPrice = currentitem.getShoePrice() *  (1-
((double)currentitem.getShoeDiscount()/(100)));

            /* Because some genius in 1883 decided ordinal numbers should be a
thing... its on sight. */
            if (i == 1) {
                System.out.print("2nd Step: ");
            }

            else if (i == 2) {
                System.out.print("3rd Step: " );
            }
            else {
                System.out.print((i+1) + "th" + " Step: ");
            }

            /* Cheapest pair still worth more than my outfits */
            if (nextShoeDiscountedPrice < prevShoeDiscountedPrice) {
                TupleGenerator cart = shoppingCart.pop();
                int price = cart.getShoePrice();

                shoppingCart.push(currentitem);
                System.out.println(shoppingCart.peek() + " as " +
currentitem.getShoePrice() + " X " + currentitem.getShoeDiscount() + " percent =
" + (int)nextShoeDiscountedPrice + " is less than " + price);
                prevShoeDiscountedPrice = nextShoeDiscountedPrice;

            }

            /* Obviously I'm a bargin hunter. No discount = no purchase */
            else if(nextShoeDiscountedPrice == prevShoeDiscountedPrice) {
                double priceEquals = currentitem.getShoePrice() *  (1-
((double)currentitem.getShoeDiscount()/(100)));
                String brand = shoppingCart.shoppingCartBrand();

                if (currentitem.getShoeDiscount() == 0) {;}
                else {
                    shoppingCart.pop();
                    shoppingCart.push(currentitem);
                }
```

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Looking at the code, immediately we can identify a for loop, in this instance the for loop will act as the primary factor for time complexity. Since there is one for loop we can identify this as having a time complexity of O(n). Once we jump inside the loop all the if and else statements have a constant time complexity of O(1). This includes accessing the elements within the TupleGenerator array as well as modifying them. Furthermore, the print statements are also O(1) complexity as shown in the lecture notes.

As such the time complexity for the provided code above following the algorithm within the assignment would hold to be O(n).