Homework Developing Algorithms

For each of the following questions, find the inputs and outputs, write the algorithm, and test the algorithm.

1. Jada wants a program that calculates and displays the sale price for a given purchase based on the percentage of the discount on that item.

|  |  |  |
| --- | --- | --- |
| Inputs: | Program: | Output: |
| Original Price | Original Price – (Original Price \* Percentage of Discount) | Sale Price |
| Percentage of Discount |

1. Read numPrice, numDiscount
2. Calculate moneySaved by numPrice \* numDiscount
3. Calculate finalPrice by numPrice – moneySaved
4. Output finalPrice

|  |  |  |
| --- | --- | --- |
| Test Cases: | | |
| numPrice | $10 | $100 |
| numDiscount | 10% | 30% |
| moneySaved | $1 | $30 |
| finalPrice | $9 | $70 |

1. A concert venue has three different ticket prices depending on seating locations: floor, terrace, and balcony. The floor seating area has 100 seats, the terrace has 250 seats, and the balcony has 50 seats. The concert venue wants a program that will calculate and display the amount of revenue generated by each seating location as well as the total.

|  |  |  |
| --- | --- | --- |
| Inputs: | Program: | Outputs: |
| Floor Price | Ticket Price \* Tickets | Floor Revenue |
| Terrace Price | Terrace Revenue |
| Balcony Price | Balcony Revenue |
| Total Revenue |

1. Set MAX\_FLOOR = 100, MAX\_TERRACE =250, MAX\_BALCONY =50
2. Read floorPrice, terracePrice, balconyPrice
3. Calculate revenueFloor by MAX\_FLOOR \* floorPrice
4. Calculate revenueTerrace by MAX\_TERRACE \* terracePrice
5. Calculate revenueBalcony by MAX\_BALCONY \* balconyPrice
6. Calculate revenueTotal by revenueFloor + revenueTerrace + revenueBalcony
7. Output revenueFloor, revenueTerrace, revenueBalcony, revenueTotal

|  |  |  |
| --- | --- | --- |
| Test Cases: | | |
| MAX\_FLOOR | 100 | 100 |
| MAX\_TERRACE | 250 | 250 |
| MAX\_BALCONY | 50 | 50 |
| floorPrice | $25 | $50 |
| terracePrice | $50 | $100 |
| balconyPrice | $100 | $200 |
| revenueFloor | $2,500 | $5,000 |
| revenueTerrace | $12,500 | $25,000 |
| revenueBalcony | $5,000 | $10,000 |
| revenueTotal | $20,000 | $40,000 |

1. Design an application for a leasing car company. The company leases cars to individuals for either 12 or 24 months. The company wants to output the monthly payment for its customers assuming they will make equal monthly payments on the leased cars.

|  |  |  |
| --- | --- | --- |
| Input: | Program: | Output: |
| Price of Car | Price of Car / 12 | Payments per Month |
| Price of Car / 24 |

1. Read priceCar
2. Calculate payment12 by priceCar divided by 12
3. Calculate payment23 by priceCar divided by 24
4. Output payment12, payment24

|  |  |  |
| --- | --- | --- |
| Test Cases: | | |
| priceCar | 12000 | 24000 |
| payment12 | 1000 | 2000 |
| payment24 | 500 | 1000 |

1. Stan has a bank account that earns him 0.05% each year. He wants to know how much money he will have in 5 years from a deposit made today.

|  |  |  |
| --- | --- | --- |
| Input: | Program: | Output: |
| Initial Deposit | Initial Deposit \* 1.0005^5 | Final Balance |

1. Set INTEREST = 1.0005
2. Read initialDeposit
3. Calculate finalBalance by initialDeposit \* INTEREST^5
4. Output finalBalance

|  |  |  |
| --- | --- | --- |
| Test Cases: | | |
| INTEREST | 1.0005 | 1.0005 |
| intialDeposit | 1000 | 2000 |
| finalBalance | 1002.5025 | 2005.005 |

1. Virginia Paint Company wants a program that calculates and displays the number of walls that can be painted from a can of paint. Each wall takes, on average, 0.8 quarts of paint.

|  |  |  |
| --- | --- | --- |
| Input: | Program: | Output: |
| Paint in Can | Paint in Can / 0.8 | Walls Painted |

1. Set PAINT\_PER\_WALL = 0.8
2. Read numPaint
3. Calculate wallsPainted by numPaint divided by PAINT\_PER\_WALL
4. Output wallsPainted

|  |  |  |
| --- | --- | --- |
| Test Cases: | | |
| PAINT\_PER\_WALL | 0.8 | 0.8 |
| numPaint | 4 | 8 |
| wallsPainted | 5 | 10 |