# COMP100-002

# Assignment 1 (Part A)

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# **Assignment 1 (Part A) – Due in week 2 at the beginning of your first COMP100 class.**

### **You will work in groups of five students. Each group will submit one printout and all members of the group will receive the same mark. Your printout should have a cover page indicating the course code → COMP100-001, the assignment title → Assignment 1 (Part A) and a list of the members of the group.**

**For each of the problems below determine what is required i.e. identify the output(s) and then the given input(s). Do a sample calculation that will transform the input into the required output. If this is successful, then the problem is solvable. If it can be solved then create a three-column IPO chart similar to the ones we did in your first class and then generate an algorithm. Else if it is not solvable then explain what is needed to make it solvable. If you make any assumption in your calculation, then you must clearly state so.**

**For each question in your submission, you must have either**

1. **the question, output, input, processing (if any) any assumptions, a sample calculation, and the IPO chart/**

**or**

1. **the question and an explanation**
2. Acme Builder’s Inc. has worked out that the wiring of an average house requires 45m of 14AWG wire. If a contractor has to wire 5 houses, what length of wire will be needed?  
     
   Output: TotalLength  
   Input: LengthPerHouse, Houses  
   Sample Calculation: TotalLength = LengthPerHouse \* Houses  
   With Numbers: 45 \* 5 = 225 m

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| Input | Processing | Output |
| LengthPerHOus  Houses | Product  Algorithm  1. Prompt and accept the LengthPerHouse and Houses 2. Calculate Product = LengthPerHouse \* Houses  3. Display the TotalLength | TotalLength |

1. Burnaby Farms wants to estimate the cost of fertilizing their fields for the coming year. Each hectare of cultivated land requires 15kg and they intend to work 300 hectares.  
     
   **Problem specification does not contain enough information to solve** (there is lack of cost for fertilizer)Output: TotalCost  
   Input: Amount, LandSize (cost of fertilizer is absent here)  
   Sample Calculation: N/A  
   With Numbers: N/A

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| Input | Processing | Output |
| Amount LandSize | N/A | TotalCost |

1. Cherry Entertainment Corp. is looking into the profitability of hosting MMA XXII at the Rogers Center. The sale of tickets, broadcasting rights and advertising will gross approximately $2 million. How much profit will Cherry Entertainment Center make if Rogers Centre cost $800, 000?  
     
   Output: Profit  
   Input: gross, cost  
   Sample calculation: gross – cost = profit  
   With Numbers: 2000,000 – 800,000 = 1,200,000

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| Input | Processing | output |
| gross  cost | Subtract  Algorithm  1. Prompt and accept gross and cost  2. Calculate profit = gross – cost  3. Display profit | profit |

1. Delta Airlines estimates that the fuel efficiency of a Boeing 747 jet is 12 liters per km. If the price of aviation fuel is $1 per liter, how much would it cost the airline to fly to New York and back from Toronto?  
     
   Problem Unsolvable, lack distance from New York to Toronto. Assume New York to Toronto one way distance is 789 km.  
     
   Output: Cost  
   Input: fuelEfficiency, distance, fuelPrice  
   Sample Calculation:  
   cost = oneWayDistance \* 2 \* fuelEfficiency \* fuelPrice  
   With Numbers: 789 \* 2 \* 12\* 1 = $18936

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| --- | --- | --- |
| Input | Processing | output |
| fuelEfficiency  oneWaydistance  fuelPrice | cost  Algorithm  1.Prompt and accept oneWayDistance  2.Calculate totalDistance= oneWayDistance \* 2  3.Prompt and accept fuelEfficiency, fuelPrice  4.cost = fuelEfficiency \* totalDistance \* fuelPrice  5.Display cost | cost |

1. Estelle’s Grocery is having a back to school sale of up to 50% off on most food items. The price of potatoes is 11₵ per kg. A plastic bag costs 5₵. What will the total cost (potatoes and bag) if someone buys 25kg of potatoes? (i think the number of bag is not mentioned here, then how do we know that how many bags are needed?)  
     
   ***Assuming Each 1 KG or potato requires 1 plastic bag***  
   Output: TotalCost  
   Input: 1KGPotato, Bag, PotatoAmount  
   Sample Calculation:TotalCost = (1KGPotato+Bag)\*PotatoAmount  
   With Numbers: (11+5)\*25 = 400

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| --- | --- | --- |
| **Input** | **Processing** | **Output** |
| 1KGPotato  Bag  PotatoAmount | TotalCost  **Algorithm:**   1. Prompt and accept !KGPotato, Bag and PotatoAmount 2. Calculate TotalCost = (1KGPotato+Bag)\*PotatoAmount 3. Display TotalCost | TotalCost |

1. Fancy Jewelers is located in the Scarborough Town Center on the second floor near to Wal-Mart. In their Boxing week sale earrings were priced at $20 per pair. If Narendra wants to get a pair for as many females in his family as he can. How many pairs can he get if he has $125? [You may assume that there are more females in his family than he can buy earrings.]  
     
   Output: Amount  
   Input: Cost, Budget  
   Sample Calculation: Amount = Floor Division(TotalBudget/Cost)  
   With Numbers: $125/$20 = Floor(6.25) = 6

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| Input | Processing | Output |
| Cost  Budget | Amount  **Algorithm:**   1. Prompt and accept Cost and Budget 2. Calculate Amount = Floor(TotalBudget/Cost) 3. Display Amount | Amount |

1. Gerard The Plumber charges $1.25 per meter for pipe installation. Each join cost 90₵. How much will Gerard charge for a job that is 12m with 4 joins?  
     
   Output: Charge  
   Input: PipeCost, JoinCost, PipeLength, JoinAmount  
   Sample Calculation: PipeCost\*PipeLength + JoinCost\*JoinAmount  
   With Numbers: 1.25\*12 + .90\*4 = 15 + 3.6 = 18.6

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| --- | --- | --- |
| Input | Processing | Output |
| PipeCost  JoinCost  PipeLength  JoinAmount | Charge  **Algorithm:**   1. **Prompt and accept PipeCost, JoinCost, PipeLength and JoinAmount** 2. **Calculate = PipeCost\*PipeLength + JoinCost\*JoinAmount** 3. **Display Charge** | Charge |

1. Last year at the CNE, the Halls family bought 50 ride tickets. If the Polar Express, the Ferris Wheel, the HighDrop and the WaterFall requires 15, 10, 12 and 9 tickets respectively, how many tickets will remain at the end of the day?  
     
   Output: Remainder  
   Input: Total, PETicket, FWTicket, HDTicket, WFTicket  
   Sample Calculation: Remainder = Total - PETicket - FWTicket - HDTicket - WFTicket  
   With Numbers: 50 - 15 - 10 - 12 - 9 = 4

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| --- | --- | --- |
| Input | Processing | Output |
| Total  PETicket  FWTicket  HDticket  WFTicket | Remainder  Algorithm   1. Prompt and accept Total, PETicket, FWTicket, HDTicket and WFTicket 2. Calculate = Total - PETicket - FWTicket - HDTicket - WFTicket 3. Display Remainder | Remainder |

1. Isabelle’s Confectionary sells a packet of sourdrops for 25₵. Each packet contains approximately 30 candies. How many packets will Sarah get if she has $3?  
     
   Output: Amount  
   Input: PacketCost, Budget  
   Sample Calculation: Amount = Budget/PacketCost  
   With Numbers: 3/0.25 = 12

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| Input | Processing | Output |
| PacketCost  Budget | Division    Algorithm:  1. Prompt and accept PacketCost, Budget  2. Calculate division = Budget / PacketCost  3. Display Amount | Amount |

1. Jake’s Towing Services works out of the Markham/Finch area. They charge $5.50 per km for towing in addition to a flat service fee of $18. What would be the cost of towing a Toyota RAV 4 from Morningside/Ellesmere to McCowan/Sheppard?  
     
   Problem Unsolvable: Not enough info provided on distance  
   Output: Cost  
   Input: ChargeFee, FlatFee, Dist (Lacking Distance)  
   Sample Calculation:   
   DistCost = Distance\*ChargeFee  
   Total = DistCost+FlatFee  
   DistCost = (7.3 \* 5.50) = 40.15  
   Total = 40.15 + 18 = 58.15

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| Input | Processing | Output |
| Dist  ChargeFee  FlatFee | DistCost Total    Algorithm:  1. Prompt and accept Dist, ChargeFee, and FlatFee  2. Calculate = ChargeFee \* Dist + FlatFee  3. Display Total | Total |