SdPd/java Lab Exam 1

Connacht Weight Management Solutions

Connacht Weight Management Solutions (CWMS) offer clients tailor made exercise, diet and lifestyle solutions. One of the classifications is based primarily on the clients' Body Mass Index (BMI).
The costs of the solutions are outlined in the following table:

<table>
<tr><td colspan="2">BMI is calculated as follows:
Metric:
BMI = (Weight in Kilograms / (Height in Metres * Height in Metres))
Example: (56 / (1.63*1.63) Gives a BMI of 21.08</td></tr>
<tr><td>BMI Categories: U, N, O, S

Underweight U: <18.5
Normal Weight N: 18.5-24.9
Overweight O: 25-29.9
Severe S: >=30</td><td>Cost per basic 1-month package:
€ 100.00
€ 120.00
€ 155.00
€ 200.00</td></tr>
<tr><td>Months Min: 1
Max: 12</td><td></td></tr>
<tr><td>CWMS T-shirt offer:
Y(es)/N(o)</td><td>Cost:
€ 5.00</td></tr>
<tr><td>Discount: 0, F, R, C, or P discount categories
0 None
F Friend referral
R Returning client
C Corporate

P Premium - 2% per €150 spent (max 6%) above €150</td><td>Discount Rate
0 %
2 %
3.5 %
4 %

0 to 6 %
0-150 = 0%
> 150 = 2%
> 300 = 4%
> 450 = 6%</td></tr>
<tr><td>Promotional Code: deducted from the cost
0.00 to 20.00 (zero or non-zero)</td><td>Promotional Discount Max Value:
€ 20.00</td></tr>
<tr><td>VAT/Tax Rate
Vat is charged on all transactions</td><td>23.00 %</td></tr>
</table>

Sample Line Input & Explanation:

Kilos	Metres	Months	TShirt	Disc	Promo
(double)	(double)	(int)	(char)	(char)	(double)
E.g. 56	1.6	1	Y	F	20.00

- Kilos - weight in kilograms (double)
- Metres - metres in height (double)
- Months - quantity (the number) of months (int) the client wishes to purchase
- TShirt - client may opt to avail of the T-shirt offer (char) **Y**(es) or **N**(o)
- Disc - discount category applicable (char) - 0, F, R, C, or P
- Promo - Promotional offer reduction (double) – may be 0.00

Develop a Java program to enable a Connacht Weight Management Solutions employee to input data for a number of clients and allow the program to calculate the clients BMI and charges associated with the services offered.

1. **Download** the lab exam 1 **zip** file and extract the folder, **Saved** on the desktop (**not** on your Network account or USB)
   – Rename the **LastNameFirstName2015LabEx1** folder & java file as per your own name
   – E.g. **AgnewGerry2015LabEx1** folder and **AgnewGerry2015LabEx1**.java program file
   – To be **verified** by your lab supervisor
   – Remember to rename the starter **class name** as per your java program file name

2. Add your **Program Id, Name** & **Program Description** as comments at the top of the program

3. **10%** of the Lab Exam marks are for the Algorithm sheet (enter your name at the top of the first page) which must be submitted at the end of the lab exam

4. **Warning:** marks will be deducted for **bad programming practices** such as:
   – Lacking meaningful variable names, white-space, indentation, etc.
   – Ensure redundant code is deleted prior to program submission
   – Ensure that non-working code is commented out prior to program submission, otherwise severe penalties will be incurred

5. **Constants:**
   Declare the 8+ necessary constants as appropriate with meaningful names and types

6. **Variables:**
   Declare any necessary variables as appropriate with meaningful names and types

7. **Initialise:**
   Initialise any necessary variables such as counters and totals (not all the variables)

8. **Preliminary Input**: – see screenshot 1 on page 5
   Ask the user how many clients they will be inputting details for.
   Allow the user to enter the number of clients for whom they wish to enter details, via the keyboard, which can vary from day to day

9. **Multi Item Line Input:** (inside the **for** loop) – see screenshot 1 on page 5
   – Allow the user to enter client details, via the keyboard, on the same input line
   – Refer to the Sample Line Input and Line Input Explained on page 1

10. **Calculations:** – see the table on page 1
    Calculate the cost of each package based on the package cost, the quantity purchased less the appropriate discount and promotional deduction (if any), plus Tee-Shirt purchased (if any), plus VAT:
    - Calculate the BMI using the (weight/(height*height)) formula provided in the table on page 1
    - Assign the appropriate BMI category (U, N, O, S) based on the BMI value
    - Determine the appropriate package cost according to the BMI category and multiply this by the quantity of months purchased
    - Calculate the Discount Amount based on the package cost (i.e. not inclusive of the T-Shirt) according to the Discount code provided
    - Calculate the Full Cost based on the package cost value less Discount Amount and less the Promotional value amount plus the Tee-Shirt (if applicable)
    - Calculate the Value Added Tax (VAT) using the VAT rate provided in the table on page 1
    - Calculate the Total Cost based on the Full Cost plus VAT cost

11. **Selection: –** BMI Type (using an **if/else if/else**):
    Determine the BMI category (U, N, O, or S) and assign the appropriate cost relevant to the category

12. **Selection: –** Tee-Shirt (**if/else)**:
    Determine whether or not to apply the fixed cost for a Tee-Shirt according to the Y(es)/N(o) prompt entered where applicable otherwise 0

13. **Selection: –** Discount (**if/else if/else** with nested **if/else if)/else**:
    – Determine the Discount rate based on the discount type entered (0, F, R, C, or P)
    – Then calculate the Discount cost based on the Package Cost according to the Discount rate

14. **Line Output: –** see screenshot on page 5
    – Output the sequential client number & package cost as shown initially unformatted with a println ( ) statement and then formatted with a printf ( ) statement for each job

completed
– Both unformatted and formatted versions are required
– Comment out the unformatted version when you get the formatted one working

15. **Header Output: –** as per screenshot on page 5
    – Display the program headers including your name aligned as specified
    – Using a big println ( ) rather than a printf ( ) statement

16. **Footer Output/Totals:** – see screenshot on page 5
    – Display program footers aligned as specified using both println ( ) and printf ( ) statements
    – Initialise, accumulate and output formatted cost totals as specified

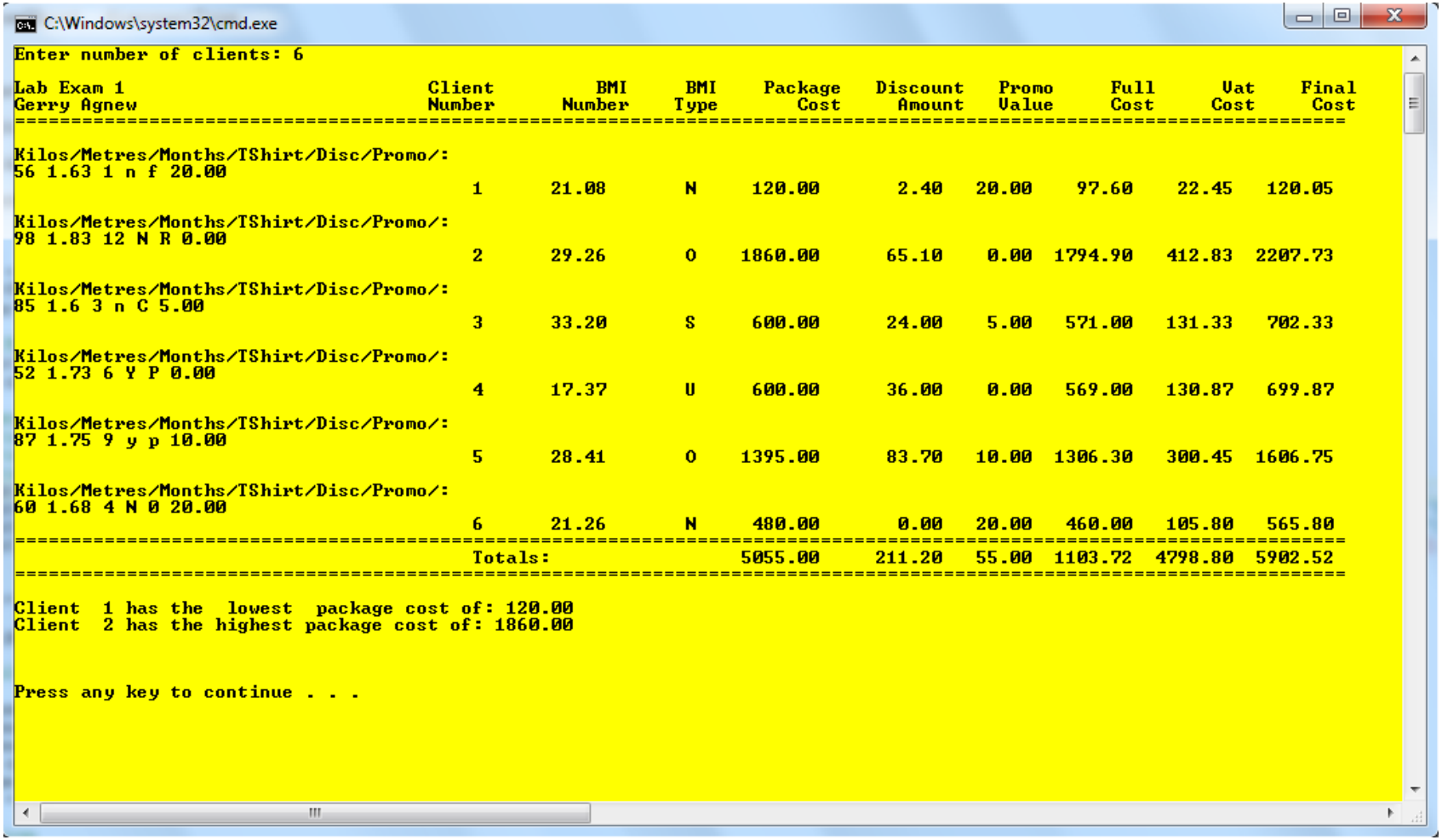
17. **Largest and Smallest:** – see screenshot on page 5
    – Determine and output details of both the largest & smallest expenditure on packages purchased and the associated client number

18. **Case Insensitive Character Processing:**
    – Enhance the program to accept and handle both upper and lower case character input
    – Specifically for the TShirt and Discount options using logical **OR** operators

19. **Save – The End:**
    When finished Save and Exit TextPad

    – Zip (R/click: Send ➔ Compressed Zip) your **LastNameFirstName2015LabEx1** folder
    – Upload your **LastNameFirstName2015LabEx1** zip file to the Moodle link provided
    – To be **verified** by your supervisor **before** you **submit** the zip file
    – Submit your Named Algorithm sheet before you exit the lab
    – Sign the **attendance sheet** before you exit the lab

20. Send a copy of your **LastNameFirstName2015LabEx1** to your U-drive as a backup.


C:\Windows\system32\cmd.exe
Enter number of clients: 6
Lab Exam 1
Gerry Agnew
Client Number
BMI Number
BMI Type
Package Cost
Discount Amount
Promo Value
Full Cost
Vat Cost
Final Cost
Kilos/Metres/Months/TShirt/Disc/Promo/:
56 1.63 1 n f 20.00
1 21.08 N 120.00 2.40 20.00 97.60 22.45 120.05
Kilos/Metres/Months/TShirt/Disc/Promo/:
98 1.83 12 N R 0.00
2 29.26 O 1860.00 65.10 0.00 1794.90 412.83 2207.73
Kilos/Metres/Months/TShirt/Disc/Promo/:
85 1.6 3 n C 5.00
3 33.20 S 600.00 24.00 5.00 571.00 131.33 702.33
Kilos/Metres/Months/TShirt/Disc/Promo/:
52 1.73 6 Y P 0.00
4 17.37 U 600.00 36.00 0.00 569.00 130.87 699.87
Kilos/Metres/Months/TShirt/Disc/Promo/:
87 1.75 9 y p 10.00
5 28.41 O 1395.00 83.70 10.00 1306.30 300.45 1606.75
Kilos/Metres/Months/TShirt/Disc/Promo/:
60 1.68 4 N 0 20.00
6 21.26 N 480.00 0.00 20.00 460.00 105.80 565.80
Totals: 5055.00 211.20 55.00 1103.72 4798.80 5902.52
Client 1 has the lowest package cost of: 120.00
Client 2 has the highest package cost of: 1860.00
Press any key to continue . . .