UNIVERSITY OF CENTRAL PUNJAB
Faculty of Information Technology & Computer Science
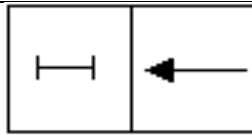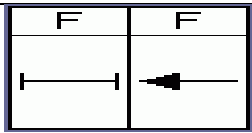Object Oriented Programming (SECP2033)
Assignment No. 3
Fall 2022 (Section O7)

Submission date: 23-01-2023 03:10pm

Submission mode/instructions: Handwritten **A4** sheets individual assignment. Sheets other than **A4** size will not be accepted. Handwritten code should also be roughly indented. READ THE QUESTIONS VERY CAREFULLY. Bring **stapled** assignment from home. Marks will be deducted for stapling and managing assignments in class.

Q. No. 1:   Aluminum sliding windows are made from pre-manufactured aluminum extrusions (sections) of different lengths, thicknesses and colors. Aluminum window is then fabricated by cutting different sections to appropriate lengths and joining the pieces in a specific order. You have to design an object oriented solution for cost calculation of sliding windows in two different designs. Cost calculation details of two different windows in standard thickness and silver color are given as under:

Design: SW1 (User Input Option = 1)			User Inputs:	Width1 = $w1$ (e.g. 8) Height1 = $h1$ (e.g. 6)
Aluminum Section	**Formula**	**Length**	**Rate**	**Cost**
DC26B	= w1	8	173	1384
DC30B	= w1+(h1*2)	20	144	2880
M23A	= h1*2	12	94	1128
M28A	= h1*2	12	106	1272
M24	= w1*2	16	98	1568
D29	= w1+(h1*2)	20	67	1340
Total Cost of Aluminum Sections				**= sum of above =** 9572 Rs.
Area of window sw1				**= w1 * h1 =** 48
Rate Rs. / Square Feet (SFT)				**= cost / area** = 9572 / 48 = 199.42 Rs / SFT

Design: SW2 (User Input Option = 2)			User Inputs:	Width1 = $w1$ (e.g. 8) Height1 = $h1$ (e.g. 6) Height2 = $h2$ (e.g. 2)
Aluminum Section	**Formula**	**Length**	**Rate**	**Cost**
DC26B	= w1	8	173	1384
DC30B	= w1+(h1*2)	20	144	2880
M23A	= h1*2	12	94	1128
M28A	= h1*2	12	106	1272
M24	= w1*2	16	98	1568
D29	= w1+(h1*2)	20	67	1340
D45A	= (w1*2)+(h2*2)	20	110	2200
D59	= h2	2	138	276
D41	= (w1*2)+(h2*4)	24	44	1056
Total Cost of Aluminum Sections				**= sum of above =** 13104 Rs.
Area of window sw1				**= w1 * (h1+h2) =** 64
Rate Rs. / Square Feet (SFT)				**= cost / area =** 13104 / 64 = 204.75 Rs / SFT

Follow the following constraints and directions for solution design and implementation:

a) Draw UML class diagram.

b) Design an abstract base class inherited by design sw1 and sw2 as required.

c) Decide carefully the type of data members with their scope and access needs. This may involve constants too.

d) Member functions may be compile time or runtime polymorphic.

e) Design appropriate constructors and destructors.

f) User of the program should be able to enter as many windows as desired. (create objects dynamically)

g) Final output should be a list of following type (ignore table borders, sample value only, your program should result in values based on user input):

Sr. No.	Design	Width 1	Height 1	Height 2	Area	Cost
1	SW1	8	6		48	9572
2	SW2	6	6	2	48	11328
3	SW2	8	6	2	64	13104
4	SW1	6	4		24	6768
…						
Total					184	40772
Rate Rs. / SFT						= 40772 / 184 = 221.59