**INTRODUCTION TO ICT**

**CSC (101)**

**ASSIGNMENT # 2**



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| **CLASS & SECTION:** | BSSE-1A |
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**PROJECT SOLVING CONCEPTS**

**Q.** **Many treadmills output the speed of the treadmill in miles per hour (mph) on the console, but most runners think of speed in terms of a pace. A common pace is the number of minutes and seconds per mile instead of mph. You want to solve this problem by developing a program. Your program starts with a quantity in mph and converts the quantity into minutes and seconds per mile. As an example, the proper output for an input of 6.5 mph should be 9 minutes and 13.8 seconds per mile.**

1. How many variables will you declare in your program? Declare these variables with proper naming conventions and appropriate datatype.

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| There will be three variables:   * “*mph*” with float datatype. It will be used to input data from user in miles per hour. * “*seconds*” with integer datatype. It will be used to store seconds value. * “*minutes*” with integer datatype. It will be used to store minutes value. |

2. What are the computational steps for converting mph into minutes and seconds per mile? Demonstrate your steps with three different scenarios.

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| First, we will divide 3600 by “mph” miles per hour value entered by user (which is being displayed on treadmill meter) to get seconds per mile value.  Then we will check if there will be only minutes with 0 seconds by checking remainder of “seconds” seconds per mile by 60.  If there is only minutes value (i.e., seconds are 0), then “seconds” seconds per minute value is divided by 60 to convert it into “minutes” minutes per second.  If condition is change i.e., seconds are not 0 then we will subtract “seconds” by remainder of “seconds” by 60 i.e., seconds-(seconds%60). And divide it by 60 to get minutes per mile “minutes” value.  Then we will get remining seconds per mile “seconds” value by seconds-(seconds%60).  First Scenario:  User enters 6.5 as miles per hour value. Condition will be evaluated and minutes per mile value will be extracted and stored in “minutes” i.e., 9. After that seconds per mile will be extracted and stored in “seconds” i.e., 13.8462. Then result will be shown in output as:  Treadmill Meter: 6.5000 miles per hour  Pace: 9 minutes and 13.8462 seconds per mile  Second Scenario:  User enters 12 as miles per hour value. Condition will be evaluated and minutes per mile value will be extracted and stored in “minutes” i.e., 8. Seconds per mile are zero so only minutes per mile value will be showed.  Treadmill Meter: 12 miles per hour  Pace: 5 minutes per mile  Third Scenario:  User enters 1 as miles per hour value. Condition will be evaluated and minutes per mile value will be extracted and stored in “minutes” i.e., 60. Seconds per mile are zero so only minutes per mile value will be showed.  Treadmill Meter: 1 miles per hour  Pace: 60 minutes per mile |

3. Draw & Write Algorithm/Flowchart/Pseudocode of your solution.

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**Q.** **Mary Smith, a student, has borrowed $3,000 to help pay her college expenses. After setting up a budget, $85 was the maximum monthly payment she could afford to make on the loan. Develop a solution to calculate and print the interest, the principal, and the balance on the loan per month. Other information she would like to know is the number of years and months it will take to pay the loan back and the total interest she will pay during that period. The interest rate is 1% per month on the unpaid balance. Keep in mind these formulas:**

* **interest normal = balance\*interest rate**
* **payment = balance – interest**
* **new balance = balance - payment**

1.How many variables will you declare in your program? Declare these variables with proper naming conventions and appropriate datatype.

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| There will be 8 variables as follows:   * “balance” with datatype integer. It will be assigned the value of loan taken and afterwards it will be used in loop to store value of remaining balance. * “interest” with datatype float. It will be used to store the value of interest every month. * “interest\_rate” with datatype float. It will store the value of interest rate i.e., 1%. It is in float because it will involve floating point division. * “max\_payment” with datatype integer. It will be used to store value of maximum payment that Mary can afford i.e., $85. * “months” with datatype integer. It will be used to store number of months. * “payment” with datatype float. It will be used to store the value of payment according to formula given in question. * “principal” with data type float. It will be used to store principal amount in payment every month. * “years” with datatype integer. It will be used to store number of years for total payment. |

2. What are the computational steps for solving all this required problem.

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| * First, we assign the loan value i.e., $3000 to variable “balance” and then shown in output. * Then we assign interest rate i.e., 1% to variable “interest\_rate” and then shown in output. * Then we assign the maximum payment that Mary could afford i.e., $85 to variable “max\_payment” and shown in output. * Then we assign value 1 to variable “months”. This variable will store the value of months and show the month number every time loop repeats. * Now we have used loops as we need to know information monthly. We have used condition “balance>0” so the loop runs till all the loan is paid. * First month number is shown in the loop so we get to know which month’s information we are reading. * Now we calculate interest according to formula and assign it to variable “interest”, It will vary every month depending on the remaining balance. * Then we output the calculated interest. * Then we have calculated payment according to given formula and then output it on screen. * Then we have used condition. If payment is greater than the budget of Mary i.e., we will pay $85 in which interest will also be included. * If payment is less than 85 then it pays amount remaining. * Then we calculate and show the value of principal amount. * Then we find remaining balance and show it on screen. * Last statement of loop is to increment value of month by 1. * And the loop repeats till the balance becomes 0. * After the loop is ended, we calculate the number of years and show time period on screen to pay loan. |

3. Draw & Write Algorithm/Flowchart/Pseudocode of your solution.

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