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| **AP® Computer Science A** | **Major Lab 03** |
| **The Speeding Ticket Program** | **70, 80 & 100 Point Versions** |
| **Assignment Purpose:**  The purpose of this lab assignment is to use decision control structures in a program so that it accurately computes the total amount of a speeding ticket | |

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| **Collaboration**  This lab assignment is done with a partner. Collaborating with somebody on finding a solution for a problem is an important skill. Few problems are solved by individuals. Not all lab assignments will be done collaboratively. Some labs you will practice with a partner, but then on "the day of reckoning" you will complete the assignment from scratch on your own. Certainly the AP Computer Science Examination, both multiple-choice and free-response is done strictly as individuals.  This lab assignment will be done with a partner from beginning to end. |

Write a program that receives information from the keyboard about driving details to determine if a speeding ticket should be written, and if so, for how much. The program starts with the two fundamentals of *What is the speed limit* and then *What was the actual speed traveled?* Additional concerns are *driving in a school zone*, *driving in a work zone* and driving *recklessly*.

Decision-making **if** control structures need to be carefully used to come to the accurate final ticket result. Make sure the program is done in stages and check if each stage works correctly.

You begin by loading the starting file, shown on the next page. The first step is to rename the starting file from **Lab03vst.java** to **Lab03v70.java**. This may seem like a waste of time. Students often do not listen and do the entire program with the starting file name. Can that work? Certainly. The wiser approach is to save each point-version and then change the name to the higher version. If you fimnish the 80-point solution correctly, save it and then rename. Perhaps the time runs out and you cannot make the 100-point version working correctly. With a saved 80-point version you have a working program that can be turned in for a grade. With the starting file you can only say that it worked 10 minute ago, but , sadly, right now you have nothing functional to show.

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| **Lab0e3bvst Student Version** | **Do not type this file, which is provided.** |
| 1 // Lab03vst.java  2 // The Speeding Ticket Program  3 // This the student starting file for Lab03.  4   5 public class Lab03vst  6 {  7 public static void main(String[] args)  8 {  9 System.out.println("Suzie Snodgrass & Seymour Schmittlap"); 10 System.out.println("Lab03, Student Starting Version\n"); 11 System.out.println("Speeding Ticket Program"); 12 }  13 } | |

**Important Note About Working with a Partner**

Some students suffer from a common virus. It is the *AssignmentDueStress* virus. On the day that a program is to be graded one partner is in class, the other partner is at home. An amazing number of times the student in class then explains that the partner has the finished program, but the partner is not here. This does not work. Any assignment that involves two or more students means that every person in the team has all the files and can be functional to work without a partner and also able to turn in the completed assignment without the presence of the partner.

**Keyboard.java Warning**

You will be writing a program that uses keyboard input. The program will involve user-defined commands that are located in the **Keyboard.java** file. If you go to the **Lab03vst.java** file in your **Lab Assignments03** folder, you will have no problem. If you decide, unwisely, to write the program somewhere else on your computer at a location of your selection, Java will get confused and not know where the Keyboard commands are.

**Names and Point Version**

Your teacher has many students and your program has multiple point versions. Start the program by changing the names and also the point version. It helps your teacher to learn your names and the point version helps to check if everything is done completely.

**70 Point Version Requirements and Output**

The 70 point version is a fundamental speeding ticket. There is not much processing. Did the driver exceed the speed limit and by how much? The ticket fluctuates in how much the driver went over the speed limit.

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| Suzie Snodgrass & Seymour Schmittlap Lab03, 70-Point Version  Speeding Ticket Program  Enter posted speed limit ==> 20 Enter actual driving speed ==> 100 You drove 80 miles over the limit You will receive a speeding ticket The minimum ticket is $75.0  Ticket so far: 75.0  Any driving speed higher than 5 miles over the limit adds $10.00 for each mile over the speed limit.  Ticket so far: 875.0  Your total ticket is 875.0 |

**80 Point Version Requirements and Output**

The 80 point version starts as the 70 point-version and then checks if the driver was in a school zone. If this is true the speeding ticket doubles.

For this program you are expected to use a compound decision structure and accept both upper-case Y and lower-case y for School Zone checking.

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| Suzie Snodgrass & Seymour Schmittlap Lab03, 80-Point Version  Speeding Ticket Program  Enter posted speed limit ==> 20 Enter actual driving speed ==> 100 You drove 80 miles over the limit You will receive a speeding ticket The minimum ticket is $75.0  Ticket so far: 75.0  Any driving speed higher than 5 miles over the limit adds $10.00 for each mile over the speed limit.  Ticket so far: 875.0  Any driving in a school zone doubles the ticket amount. Did speeding happen in a school zone ==> Y  Ticket so far: 1750.0  Your total ticket is 1750.0 |

**100 Point Version Requirements and Output**

The 100-Point version adds more situations. Perhaps you think these are made up, but tickets are not necessarily the same everywhere. Many students believe that a school zone is 20 mph. True enough in many cities and suburbs, but not in rural areas. You may find 35 mph and even 55 mph school zones in rural areas. There are places that give a $10,000 fine for hitting a worker. Do keep in mind that even though the program did attempt to resemble real life, the primary mission is to practice and demonstrate knowledge of decision control structures.

This program adds computations for presence in a work zone, determining if a driver hit a worker and if the driver was speeding recklessly, which is defined as driving above 80 mph.

**100 Point Version Requirements and Output Continued**

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| Suzie Snodgrass & Seymour Schmittlap Lab03, 100-Point Version  Speeding Ticket Program  Enter posted speed limit ==> 20 Enter actual driving speed ==> 100 You drove 80 miles over the limit You will receive a speeding ticket The minimum ticket is $75.0  Ticket so far: 75.0  Any driving speed higher than 5 miles over the limit adds $10.00 for each mile over the speed limit.  Ticket so far: 875.0  Any driving in a school zone doubles the ticket amount. Did speeding happen in a school zone ==> Y  Ticket so far: 1750.0  Any speeding in a work zone doubles the ticket amount. Did speeding happen in a work zone ==> Y  Ticket so far: 3500.0  Hitting a worker adds a $10000.0 to the ticket. Was a worker hit in a work zone ==> Y  Ticket so far: 13500.0  Driving more than 80 mph is considered reckless. This adds $100.00 for every mile over 80 MPH.  Your total ticket is 15500.0 |