# JAVA PROGRAMMING PROJECTS – CHAPTER 1 – GETTING STARTED

|  |  |
| --- | --- |
| **Project 1** | One way to measure the amount of energy that is expended during exercise is to use metabolic equivalents (MET). Here are some METS for various activities:  Running 6 MPH: 10 METS  Basketball: 8 METS  Sleeping: 1 MET  The number of calories burned per minute may be estimated using the following formula:  CaloriesjMinute = 0.0175 \* MET \* Weight in kilograms  Write a program that calculates and outputs the total number of calories burned for a 150-pound person who runs 6 MPH for 30 minutes, plays basketball for 30 minutes, and then sleeps for 6 hours. One kilogram is equal to 2.2 pounds. |

|  |  |
| --- | --- |
| **Project 2** | The video game machines at your local arcade output coupons according to how well you play the game. You can redeem 10 coupons for a candy bar or 3 coupons for a gumball. You prefer candy bars to gumballs. Write a program that defines a variable initially assigned to the number of coupons you win. Next, the program should output how many candy bars and gumballs you can get if you spend all of your coupons on candy bars first, and any remaining coupons on gumballs. |

|  |  |
| --- | --- |
| **Project 3** | Write a program that starts with the string variable first set to your first name and the string variable last set to your last name. Both names should be all lowercase.  Your program should then create a new string that contains your full name in pig latin with the first letter capitalized for the first and last name. Use only the pig latin rule of moving the first letter to the end of the word and adding “ay.” Output the pig latin name to the screen. Use the substring and toUpperCase methods to construct the new name.  For example, given  first = "walt";  last = "savitch";  the program should create a new string with the text “Altway Avitchsay” and print it. |

|  |  |
| --- | --- |
| **Project 4** | A government research lab has concluded that an artificial sweetener commonly used in diet soda pop will cause death in laboratory mice. A friend of yours is desperate to lose weight but cannot give up soda pop. Your friend wants to know how much diet soda pop it is possible to drink without dying as a result.  Write a program to supply the answer. The program has no input but does have defined constants for the following items: the amount of artificial sweetener needed to kill a mouse, the weight of the mouse, the starting weight of the dieter, and the desired weight of the dieter. To ensure the safety of your friend, be sure the program uses the weight at which the dieter will stop dieting, rather than the dieter’s current weight, to calculate how much soda pop the dieter can safely drink. You may use any reasonable values for these defined constants. Assume that diet soda contains 1/10th of 1% artificial sweetener. Use another named constant for this fraction.  You may want to express the percent as the double value 0.001. (If your program turns out not to use a defined constant, you may remove that defined constant from your program.) |

|  |  |
| --- | --- |
| **Project 5** | Write a program that starts with a line of text and then outputs that line of text with the first occurrence of "hate" changed to "love" . For example, a possible sample output might be  The line of text to be changed is:  I hate you.  I have rephrased that line to read:  I love you.  You can assume that the word "hate" occurs in the input. If the word "hate" occurs more than once in the line, your program will replace only the first occurrence of "hate". Use a defined constant for the string to be changed. To make your program work for another string, you should only need to change the definition of this defined constant. |

|  |  |
| --- | --- |
| **Project 6** | Bicyclists can calculate their speed if the gear size and cadence is known. Gear size refers to the effective diameter of the wheel. Gear size multiplied by pi (3.14) gives the distance travelled with one turn of the pedals. Cadence refers to the number of pedal revolutions per minute (rpm). The speed in miles per hour is calculated by the following:    This is a program that calculates the speed for a gear size of 100 inches and a cadence of 90 rpm. This would be considered a high cadence and a maximum gear size for a typical bicycle.  1/12 will result in 0, because both 1 and 12 are integers, and when the integer division is performed, the fractional part is discarded. |

|  |  |
| --- | --- |
| **Project 7** | Write a program that outputs the number of hours, minutes, and seconds that corresponds to 50,391 total seconds. The output should be 13 hours, 59 minutes, and 51 seconds. Test your program with a different number of total seconds to ensure that it works for other cases. |

|  |  |
| --- | --- |
| **Project 8** | The following program will compile and run, but it uses poor programming style.  Modify the program so that it uses the recommended spelling conventions, constant naming conventions, and formatting style.  **public class messy {**  **public static void main(String[] args)**  **{**  **double TIME; double PACE;**  **System.out.println("This program calculates your pace given a time and distance traveled.");**  **TIME = 35.5; /\* 35 minutes and 30 seconds \*/**  **PACE = TIME / distance;**  **System.out.println("Your pace is " + PACE + " miles per hour.");**  **}**  **public static final double distance = 6.21;**  **}** |

|  |  |
| --- | --- |
| **Project 9** | A simple rule to estimate your ideal body weight is to allow 110 pounds for the first 5 feet of height and 5 pounds for each additional inch. Write a program with a variable for the height of a person in feet and another variable for the additional inches. Assume the person is at least 5 feet tall. For example, a person that is 6 feet and 3 inches tall would be represented with a variable that stores the number 6 and another variable that stores the number 3. Based on these values, calculate and output the ideal body weight. |