**COMP2026 Problem Solving Using Object Oriented Programming**

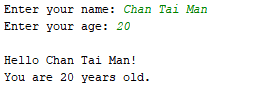
# Laboratory 2

# Part A Discovery Exercises

***\*Type your answers in XXXXXXXX\_lab02.docx***

**Task 1: More about Reading Input**

Run the given **ReadingInput.java** program. Enter your name and age to get the output. For example,



Modify the **ReadingInput** program, so that it read in the age first and then the name. The program becomes:

|  |
| --- |
| import java.util.Scanner;  public class ReadingInput {  public static void main(String[] args) {  new ReadingInput().runApp();  }    void runApp() {  Scanner in = new Scanner(System.in);  System.out.print("Enter your age: ");  int age = in.nextInt();  System.out.print("Enter your name: ");  String name = in.nextLine();    System.out.println();  System.out.println("Hello " + name + "!");  System.out.println("You are " + age + " years old.");  in.close();  }  } |

Run the **ReadingInput.java** program again. Enter your age and name to get the output.

What happened? Why? How to fix it? (hints on slides)

|  |
| --- |
| **It skips the input of the name.**  **It's because when you enter a number then press Enter, in.nextInt() consumes only the number, not the "end of line".**  **We need to add in.nextLine() before scanning the string.** |

**Task 2: If statements**

In this task, the problems are provided without indentation, which is not a good practice, making it hard for others to read and understand the code. They were made on purpose to confuse you.

1. Determine the output for each of the following code fragment when x is 6 and y is 8.

|  |
| --- |
| if( x < 7)  if( y > 7)  System.out.print("A");  else  System.out.print("B");  System.out.print("C"); |

Output: AC

|  |
| --- |
| if( x < 7)  {  if( y > 7)  System.out.print("A");  }  else  {  System.out.print("B");  System.out.print("C");  } |

Output A.

1. Given:

|  |
| --- |
| if( y == 10)  if( x == 5)  System.out.print("A");  else  System.out.print("B");  System.out.print("C");  System.out.print("D"); |

Modify the given code above to produce the output shown in each part of the problem. Make no changes other than inserting braces and changing the indentation of the code. [Note: It is possible that no modification is necessary for some of the parts.]

1. Assume that x = 5 and y = 10, the output "ACD" is produced.

|  |
| --- |
| if( y == 10)  if( x == 5)  System.*out*.print("A");  else  System.*out*.print("B");  System.*out*.print("C");  System.*out*.print("D"); |

1. Assume that x = 5 and y = 10, the output "A" is produced.

|  |
| --- |
| if( y == 10)  if( x == 5)  System.*out*.print("A");  else{  System.*out*.print("B");  System.*out*.print("C");  System.*out*.print("D");} |

1. Assume that x = 5 and y = 11, the output "BCD" is produced.

|  |
| --- |
| if( y == 10)  if( x == 5)  System.*out*.print("A");  else{}  System.*out*.print("B");  System.*out*.print("C");  System.*out*.print("D"); |

1. Fix the error(s) in the following if statement. Hint: What will happen when y = 0?

|  |  |
| --- | --- |
| if (x%y == 0)  System.out.println("x is divisible by y");  }  else if(y == 0)  {  System.out.println("No Solution.");  }  else{  System.out.println("x is not divisible by y");  }   |  | | --- | | Answer:  if (y == 0){  System.*out*.println("No Solution."); } else if(x%y == 0) {  System.*out*.println("x is divisible by y"); } else{  System.*out*.println("x is not divisible by y"); } | |

1. Fix the error(s) in the following if statement.

|  |  |
| --- | --- |
| if (score > 60)  {  System.out.println("C");  }  else if(score > 70)  {  System.out.println("B");  }  else if(score > 80)  {  System.out.println("A");  }  else  {  System.out.println("F");  }   |  | | --- | | Answer  if (score > 80) {  System.*out*.println("A"); } else if(score > 70) {  System.*out*.println("B"); } else if(score > 60) {  System.*out*.println("C"); } else {  System.*out*.println("F"); } | |

**Task 3: Short Circuit Evaluation (Shortcuts)**

Java evaluates the **&&** and **||** operators using a strategy called short-circuit mode in which it evaluates the right operand only if it needs to do so.

For example, if x is 0, the right-hand operand of **&&** in

**x != 0 && n / x == 0**

is not evaluated at all because **x != 0** is **false**. The expression

**false &&** ***whatever***

is always **false**, the rest of the expression no longer matters.

Similarly, the right-hand operand of **||** in

**true ||** ***whatever***

is not evaluated at all because the expression is always **true**, the rest of the expression no longer matters.

Set the values of x, y and z in the following program to give the output “ABC”.

|  |
| --- |
| **int x = 1;**  **int y = 2;**  **int z = 0;**  if (x != 0 && y / x > 0) {  System.out.print("A");  }  if (y - z != 1 && x \* y \* z == 0) {  System.out.print("B");  }  if ( x + y == 3 || y / z < 0) {  System.out.print("C");  } |

**Task 4: Switch Statements**

1. Rewrite the following code fragment using **switch** statement.

|  |
| --- |
| if(c == 'E' || c == 'e')  countE++;  else if(c == 'A' || c == 'a')  countA++;  else if(c == 'I' || c == 'i')  countI++;  else  System.out.println("Error—Not A, E, or I"); |

Answer:

|  |
| --- |
| switch(c) {  case 'E':  case 'e':  countE++;  break;   case 'A':  case 'a':  countA++;  break;   case 'I':  case 'i':  countI++;  break;   default :  System.*out*.println("Error—Not A, E, or I");  break;   } |

1. Rewrite the following code fragment using if statement.

|  |
| --- |
| switch (x){  case 101:  case 105: System.out.println("Turn Left");  break;  case 121:  case 176: System.out.println("Turn Right");  break;  default:  System.out.println("Stop");  } |

Answer:

|  |
| --- |
| if (x==101 || x==105){  System.*out*.println("Turn Left"); }  else if (x==121 || x==176){  System.*out*.println("Turn Right");}  else   System.*out*.println("Stop"); } |

**References**

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