

PSEUDOCODE AND ALGORITHM DEVELOPMENT

Description of problem:

The U.S. post office has rules about mailing packages. A package cannot be mailed first class if the sum of its length and girth is greater than 100 inches, or if the package weighs more than 70 pounds. The girth is the perimeter around the height and width, where the length is defined as the longest of the three dimensions.

Write a program that takes in the weight of the package and the three dimensions of the package in any order. The program should determine the longest dimension of the package, calculate the girth, and compute the size of the box. The program should then print out one of the following messages about this package:

1. Package is too large and too heavy.
2. Package is too large.
3. Package is too heavy.
4. Package is acceptable.

Development of pseudocode:

Stepwise refinement 1 - Overall sections of this problem:

Get data from user
Solve math
Print answer

Stepwise refinement 2 - More detailed pseudocode version:

Prompt user for three dimensions
Prompt user for weight

Determine longest of three dimensions
Calculate the girth using the other two dimensions

If package is too big and too heavy, print appropriate message
else if package is too big, print appropriate message
else if package is too heavy, print appropriate message
else print package is acceptable

Stepwise refinement 3 - Determining longest of three dimensions:

My strategy is to end up with dim1 holding the largest value
Compare dim2 and dim1, if dim2 is greater, swap dim1 and dim2, dim1 will be holding largest value
Compare dim3 and dim1, if dim3 is greater, swap dim1 and dim3, dim1 is still holding largest value
Dim1 has largest value, compute math for package

Source code answer for mail problem:

```
import chn.util.*;

class CheckMail
{
    private int myWeight, myLength, myWidth, myHeight;

    // Here are the constructor methods...
    public CheckMail ()
    {
        myWeight = myLength = myWidth = myHeight = 1;
    }

    public CheckMail(int weight, int length, int width, int height)
    {
        myWeight = weight;
        myLength = length;
        myWidth = width;
        myHeight = height;
    }

    public void dataInput()
    {
        ConsoleIO keyboard = new ConsoleIO();
        int temp = 0;

        System.out.print("Enter the weight --> ");
        myWeight = keyboard.readInt();

        System.out.print("Enter 3 dimensions separated by spaces --> ");
        myLength = keyboard.readInt();
        myWidth = keyboard.readInt();
        myHeight = keyboard.readInt();

        if (myWidth > myLength)
        {
            // swapping values of myWidth and myLength, using third variable temp
            temp = myWidth; myWidth = myLength; myLength = temp;
        }
        if (myHeight > myLength)
        {
            // swapping values of myHeight and myLength, using third variable temp
            temp = myHeight; myHeight = myLength; myLength = temp;
        }
        System.out.println();
        System.out.println();
    }

    // prints out answers
    public void printAnswer()
    {
        int total = myLength + (myWidth*2) + (myHeight*2);
        boolean tooLarge = (total > 100);
        boolean tooHeavy = (myWeight > 70);

        System.out.println("Weight = " + myWeight + " lbs");
        System.out.println("Length = " + myLength);
        System.out.print("Other two dimensions = ");
        System.out.println(myWidth + " " + myHeight);
        System.out.println();
    }
}
```

```

        System.out.print(" Package is - ");

        if (tooLarge && tooHeavy)
            System.out.println("too large and too heavy");
        else
            if (tooLarge && !tooHeavy)
                System.out.println("too large");
            else
                if (!tooLarge && tooHeavy)
                    System.out.println("too heavy");
                else
                    if (!tooLarge && !tooHeavy)
                        System.out.println("acceptable");

        System.out.println();
    }

public static void main(String[] args)
{
    CheckMail aPackage = new CheckMail ();
    aPackage.dataInput();
    aPackage.printAnswer();
}
}

```