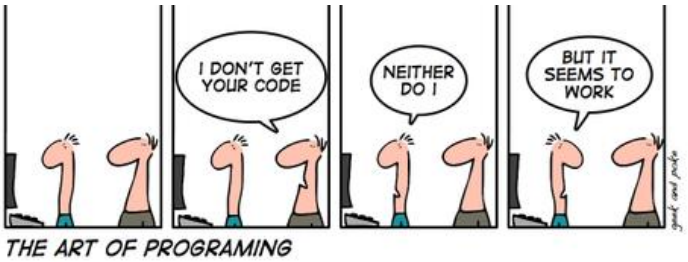
IC470, Software Engineering

Lab 4

Due: As per the course syllabus

Lab Focus: Code Analysis: Coupling/Cohesion and McCabe's Metric



Lab Partners. If there are other mids in this section from your capstone team, you may work together as a lab group. If not, pair up with another free mid from this section and work together on this lab. Include the names of your lab team members on each piece of paper you turn in for this lab.

Deliverables:

Turn a paper copy (with the names of all the midshipmen in your lab team at the top) of your type-written answers to each of the below (make a google doc of the tables in question 1), and a copy of the spreadsheet produced as part of your McCabe's Metric analysis from question 2. Neatly hand drawn figures are fine for the McCabe's graph.

Lab assignment: During the lab period, your lab team is to:

1. **Cohesion and Coupling.** Inspect the source code in the Java source code files (MDICraps.java and MDIGridBag.java) posted on the course's Resources page and complete the following table. Note: you do not need to compile or run the source code files.

a. **Cohesion**. Determine the lowest (worst) cohesion for each of the methods below from the given source code, and explain why you chose that level of cohesion.

Class	**Method()**	**Cohesion level** (give the name)	**Specific lines of source code involved** (give the actual lines, not the line numbers)	**Why this level of cohesion?**
MDICraps	`rollDice()`			
MDICraps	`actionPerformed()`			
MDIGridBag	`init()`			
MDIGridBag	`addToCrapsTotal()`			

b. **Coupling.**

i. Determine the tightest (worst) level of coupling for each of the methods below from the given source code, and explain why you chose that level of coupling.

Class	Method()	Coupling level	Specific lines of source code involved	Why this level of coupling?
MDICraps	`actionPerformed()`			
MDIGridBag	`getDataFromFile()`			

ii. Examine the MDICraps::`actionPerformed()` method.

1. What method from MDIGridbag is coupled with MDICraps::`actionPerformed()`?

   _____

2. What level of coupling exists between these two methods?__

   _____

3. Explain why you chose the level of coupling you gave in 2 above

   _____

2. **McCabe's Metric.** Run the CodeAnalyzerPro source code analysis tool (see course's Resources page for JAR file and README.txt) on the given Java source code files. Inspect the results of the code analysis (via the spreadsheet the JAR file produced) and:
    a. **Method identification.** Identify the method that CodeAnalyzerPro indicates as having the highest Complexity value (shown in column J of the spreadsheet it produces).
    b. **McCabe's graph.** Draw the McCabe graph that corresponds to the method.
    c. **# edges, # nodes.** Give the number of edges and nodes in your graph to part b
    d. **M value equation.** Show the equation for and compute McCabe's M value for your graph in part b using the edges and nodes determined in part c.
    e. **Does your computed M value match the Complexity found by CodeAnalyzerPro?** Determine whether your M value computation matched the Complexity value for the method in part a as produced by the source code analysis tool. If the two are not in agreement, explain why.
    f. **Redesign Indicated?** Determine whether the method in part a should be redesigned based on your M value computation from part d. Explain your answer.