

**Project 3 – Classes, objects, File input, formatted output, selection, looping**

Due: zip archive of *entire* project to Canvas by Mon, Nov 3 2025, 11:59 pm

Concepts covered in this assignment – text file input (Scanner class), formatted output to screen (printf), objects and classes, constructors, instance variables, getters and setters, UML diagram, selection, looping, nested loops – only use these concepts even if you can think of a more efficient solution. Solutions using concepts not covered will receive a big points penalty. Absolutely no arrays!

**Deliverables to Canvas:**

1. .zip file of the entire project
2. .pdf file of your reflection

**Reflection:**

Along with your code, in a .pdf file, submit a 2-3 paragraph reflection about your experience with the project. Address topics like what was tricky, what was easy, what you didn't expect, what you had to pay special attention to, what you learned.

First, read the whole assignment and understand what it asks. Sketch a plan of your logic.

**Problem:**

Lord Havelock Vetinari, the Patrician of Ankh-Morpork has decided to give a credit allowance to the registered guilds in exchange for their monthly dues. The Guild of Seamstresses gets an allowance of 180 garments (they don't really make clothes) per 30 days or an average of 6 per day. The Guild of Thieves gets 60 free robberies per 30 days (or 2 per day on average) and the Guild of Assassins gets 30 free murders per 30 days (on average 1 per day). Each guild sends in a file with 30 lines. Each line represents the credits they apply for for each day in the upcoming 30-day span. These input files can be downloaded from Canvas and they're called *seamstresses.txt*, *thieves.txt*, and *assassins.txt*. There is a second set of input files named *seamstresses2.txt*, *thieves2.txt*, and *assassins2.txt*.

For every day in the 30 days span each guild will apply for a certain number of credits. They can apply for any non-negative number of credits for the day. When a guild has exhausted their monthly allowance, they get no more credits for the rest of the period regardless of whether or not they apply for more. The Patrician's office only allows a total of 10 credits per day regardless of which kind they are.

Credits are distributed in a Round Robin fashion – a credit each to the Seamstresses, then the Thieves, then the Assassins until the 10 credits for the day run out. If a guild has applied for more credits than it's being approved for on that day, the extra days accumulate as potential credits the guild carries into the future. If it's a guild's turn to receive a credit but it has already received all it's applied for for the day, credits are transferred from the carry balance into the approved balance. The full 10 credit allowance per day may not be given out if there are less than 10 credits applied for for the day plus carry balance from all three guilds combined.

Consider the following example: If on the first day of the month the Seamstresses apply for 6 credits, the Thieves apply for 5 and the Assassins apply for 2, on the first round of the Round Robin distribution they each get 1 credit for 1 garment, 1 robbery, 1 murder. On the second round the tally is 2 garments, 2 robberies, 2 murders. On the third round it's 3 garments, 3 robberies and 2 murders (the Assassins didn't apply for any more). Fourth round 4 garments, 4 robberies and 2 murders – and that's all the credits for the day. The Seamstresses will add the unapproved 2 credits to their carry balance and the Thieves will carry 1.

If on the second day the Seamstresses apply for 2 garments, the Thieves for 1 robbery and the Assassins for 1 murder round one will finish as 1 garment / 1 robbery / 1 murder. In the second round the Seamstresses get their 2<sup>nd</sup> garment, the Thieves haven't applied for any more but they transfer 1 robbery

out of their carry balance to their approved robberies. The Assassins didn't apply for more and don't have any carry balance so they stay with 1 murder. Third Round Robin round ends as 3 / 2 / 1 and the fourth as 4 / 2 / 1. The whole daily balance hasn't been given out but there are no more credit applications and no more carry credits so that's it for day 2.

The most credits per 30-day period given out are  $180 + 60 + 30 = 270$ .

### **Follow the steps:**

- A. Open BlueJ (or use your IDE of choice but instructions here are to be used with BlueJ) and create a **new** project, call it Project3 (there should be no other existing code in your project).
- B. Download the partially written *Project3.java* file and the 6 input .txt files from Canvas. Put them into your Project3 directory. Drag and drop the files into BlueJ. If that doesn't work, close and reopen BlueJ using the package file for Project3.
- C. Create a new class, name it *Guild*. There will be 3 guild objects, one for each Guild. They are created for you in the partially written *main* method and will be passed to the *distributeCredits* method you have to implement.
- D. Implement the *Guild* class according to the following UML diagram. Do not add or alter methods, make sure you spell all names exactly as in the UML. Make sure you have the correct visibility modifiers and return types. Document your class and *all* its method with doc-comments.

Guild
<ul style="list-style-type: none"> <li>- name : String</li> <li>- approved : int</li> <li>- carry : int</li> <li><u>- allCredits : int</u></li> </ul>
<ul style="list-style-type: none"> <li>+ Guild()</li> <li>+ Guild( name : String )</li> <li>+ getName() : String</li> <li>+ getApproved() : int</li> <li>+ getCarry() : int</li> <li><u>+ getAllCredits() : int</u></li> <li>+ addCredits( approved : int ) : void</li> <li>+ addCarry( int notApproved : int ) : void</li> </ul>

The second constructor should call the standard constructor

The class (static) variable keeps a tally of all credits across all three guilds.

- E. In the Project3 class, write code to complete the *distributeCredits* methods.

*Hint:* The *distributeCredits* methods receives the *Guild* objects created in the main as parameters, as well as the file names for the input data.

- a. Don't alter any code in the *main* method
- b. Don't alter any code in the *printTotal* method, it gives you the grand total for the 30 days
- c. Don't change the method header of the *distributeCredits* method
- d. The *distributeCredits* method should:
  - Read the three input files in parallel and work on each day, print out the data for the day and move on; you are NOT allowed to use any containers or collections like Arrays, ArrayLists etc.
  - Distribute credits in Round Robin fashion
  - Make sure the daily credit total is not exceeded
  - Make sure the monthly totals for every guild are not exceeded
  - Print the totals for every day properly formatted and aligned
  - Distinguish between singular and plural credits, e.g. garment vs. garments
- e. Use the two test cases to check your program output for correctness

Below is the output of a successfully completed program with the first set of test data and then the second set of test data. While normally creative programming is appreciated, given the example input, your output MUST look *exactly* like below - formatting, alignment, capitalization, singular/plural and all, for full credit. Your program will be tested with different input.

When you are done, make sure your code is properly indented, commented with class and method doc-comments; then zip your *entire project* and upload it to Canvas.

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BlueJ: Terminal Window - Project3
Options

1st: Seamstresses 7 garments approved (7 total approved, 0 not yet approved)
      Assassins 3 murders approved (3 total approved, 0 not yet approved)
2nd: Seamstresses 4 garments approved (11 total approved, 0 not yet approved)
      Thieves 4 robberies approved (4 total approved, 1 not yet approved)
      Assassins 2 murders approved (5 total approved, 0 not yet approved)
3rd: Thieves 1 robbery approved (5 total approved, 0 not yet approved)
      Assassins 2 murders approved (7 total approved, 0 not yet approved)
4th: Thieves 5 robberies approved (10 total approved, 0 not yet approved)
5th: Seamstresses 3 garments approved (14 total approved, 0 not yet approved)
6th: Seamstresses 2 garments approved (16 total approved, 0 not yet approved)
      Assassins 6 murders approved (13 total approved, 0 not yet approved)
7th: Seamstresses 8 garments approved (24 total approved, 0 not yet approved)
      Thieves 1 robbery approved (11 total approved, 0 not yet approved)
8th: Seamstresses 2 garments approved (26 total approved, 0 not yet approved)
9th: Thieves 1 robbery approved (12 total approved, 0 not yet approved)
      Assassins 1 murder approved (14 total approved, 0 not yet approved)
10th: Thieves 6 robberies approved (18 total approved, 0 not yet approved)
11th: Seamstresses 4 garments approved (30 total approved, 0 not yet approved)
      Assassins 3 murders approved (17 total approved, 0 not yet approved)
12th: Seamstresses 3 garments approved (33 total approved, 0 not yet approved)
13th: No credits.
14th: Seamstresses 6 garments approved (39 total approved, 0 not yet approved)
      Assassins 2 murders approved (19 total approved, 0 not yet approved)
15th: No credits.
16th: Seamstresses 3 garments approved (42 total approved, 0 not yet approved)
      Thieves 2 robberies approved (20 total approved, 0 not yet approved)
      Assassins 4 murders approved (23 total approved, 0 not yet approved)
17th: Seamstresses 2 garments approved (44 total approved, 0 not yet approved)
      Thieves 3 robberies approved (23 total approved, 0 not yet approved)
18th: Thieves 1 robbery approved (24 total approved, 0 not yet approved)
19th: No credits.
20th: Seamstresses 5 garments approved (49 total approved, 0 not yet approved)
21st: Seamstresses 7 garments approved (56 total approved, 0 not yet approved)
      Assassins 1 murder approved (24 total approved, 0 not yet approved)
22nd: Seamstresses 6 garments approved (62 total approved, 3 not yet approved)
      Thieves 4 robberies approved (28 total approved, 0 not yet approved)
23rd: Seamstresses 3 garments approved (65 total approved, 0 not yet approved)
      Thieves 4 robberies approved (32 total approved, 3 not yet approved)
      Assassins 3 murders approved (27 total approved, 0 not yet approved)
24th: Seamstresses 2 garments approved (67 total approved, 0 not yet approved)
      Thieves 8 robberies approved (40 total approved, 1 not yet approved)
25th: Seamstresses 4 garments approved (71 total approved, 0 not yet approved)
      Thieves 1 robbery approved (41 total approved, 0 not yet approved)
      Assassins 3 murders approved (maxed out at 30 total approved)
26th: No credits.
27th: Seamstresses 1 garment approved (72 total approved, 0 not yet approved)
28th: No credits.
29th: Seamstresses 2 garments approved (74 total approved, 0 not yet approved)
30th: Seamstresses 5 garments approved (79 total approved, 0 not yet approved)

Total credits this month: 150 (79 garments, 41 robberies, 30 murders)

Can only enter input while your programming is running
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## Options

1st: Seamstresses 6 garments approved (6 total approved, 0 not yet approved)  
Thieves 2 robberies approved (2 total approved, 0 not yet approved)  
Assassins 1 murder approved (1 total approved, 0 not yet approved)  
2nd: Seamstresses 5 garments approved (11 total approved, 0 not yet approved)  
Thieves 1 robbery approved (3 total approved, 0 not yet approved)  
Assassins 1 murder approved (2 total approved, 0 not yet approved)  
3rd: Seamstresses 8 garments approved (19 total approved, 2 not yet approved)  
Thieves 1 robbery approved (4 total approved, 0 not yet approved)  
Assassins 1 murder approved (3 total approved, 0 not yet approved)  
4th: Seamstresses 4 garments approved (23 total approved, 19 not yet approved)  
Thieves 4 robberies approved (8 total approved, 2 not yet approved)  
Assassins 2 murders approved (5 total approved, 0 not yet approved)  
5th: Seamstresses 6 garments approved (29 total approved, 24 not yet approved)  
Thieves 3 robberies approved (11 total approved, 0 not yet approved)  
Assassins 1 murder approved (6 total approved, 0 not yet approved)  
6th: Seamstresses 5 garments approved (34 total approved, 24 not yet approved)  
Thieves 5 robberies approved (16 total approved, 0 not yet approved)  
7th: Seamstresses 5 garments approved (39 total approved, 29 not yet approved)  
Assassins 5 murders approved (11 total approved, 7 not yet approved)  
8th: Seamstresses 4 garments approved (43 total approved, 26 not yet approved)  
Thieves 3 robberies approved (19 total approved, 5 not yet approved)  
Assassins 3 murders approved (14 total approved, 4 not yet approved)  
9th: Seamstresses 4 garments approved (47 total approved, 28 not yet approved)  
Thieves 3 robberies approved (22 total approved, 12 not yet approved)  
Assassins 3 murders approved (17 total approved, 2 not yet approved)  
10th: Seamstresses 4 garments approved (51 total approved, 29 not yet approved)  
Thieves 3 robberies approved (25 total approved, 12 not yet approved)  
Assassins 3 murders approved (20 total approved, 0 not yet approved)  
11th: Seamstresses 5 garments approved (56 total approved, 42 not yet approved)  
Thieves 4 robberies approved (29 total approved, 10 not yet approved)  
Assassins 1 murder approved (21 total approved, 0 not yet approved)  
12th: Seamstresses 5 garments approved (61 total approved, 56 not yet approved)  
Thieves 5 robberies approved (34 total approved, 9 not yet approved)  
13th: Seamstresses 4 garments approved (65 total approved, 52 not yet approved)  
Thieves 3 robberies approved (37 total approved, 6 not yet approved)  
Assassins 3 murders approved (24 total approved, 1 not yet approved)  
14th: Seamstresses 4 garments approved (69 total approved, 59 not yet approved)  
Thieves 4 robberies approved (41 total approved, 3 not yet approved)  
Assassins 2 murders approved (26 total approved, 0 not yet approved)  
15th: Seamstresses 6 garments approved (75 total approved, 54 not yet approved)  
Thieves 4 robberies approved (45 total approved, 0 not yet approved)  
16th: Seamstresses 5 garments approved (80 total approved, 49 not yet approved)  
Thieves 5 robberies approved (50 total approved, 4 not yet approved)  
17th: Seamstresses 6 garments approved (86 total approved, 43 not yet approved)  
Thieves 4 robberies approved (54 total approved, 0 not yet approved)  
18th: Seamstresses 10 garments approved (96 total approved, 37 not yet approved)  
19th: Seamstresses 7 garments approved (103 total approved, 41 not yet approved)  
Thieves 3 robberies approved (57 total approved, 0 not yet approved)  
20th: Seamstresses 6 garments approved (109 total approved, 38 not yet approved)  
Thieves 3 robberies approved (maxed out at 60 total approved)  
Assassins 1 murder approved (27 total approved, 0 not yet approved)  
21st: Seamstresses 10 garments approved (119 total approved, 28 not yet approved)  
22nd: Seamstresses 10 garments approved (129 total approved, 18 not yet approved)  
23rd: Seamstresses 9 garments approved (138 total approved, 19 not yet approved)  
Assassins 1 murder approved (28 total approved, 0 not yet approved)  
24th: Seamstresses 10 garments approved (148 total approved, 18 not yet approved)  
25th: Seamstresses 9 garments approved (157 total approved, 19 not yet approved)  
Assassins 1 murder approved (29 total approved, 0 not yet approved)  
26th: Seamstresses 9 garments approved (166 total approved, 20 not yet approved)  
Assassins 1 murder approved (maxed out at 30 total approved)  
27th: Seamstresses 10 garments approved (176 total approved, 10 not yet approved)  
28th: Seamstresses 4 garments approved (maxed out at 180 total approved)  
29th: No credits.  
30th: No credits.

Total credits this month: 270 (180 garments, 60 robberies, 30 murders)