PSP1

Personal Software Process (PSP) for Engineers: Part II

Points: 50

Program requirements

Program requirements

Using PSP1, write a program to compute the greatest common divisor (GCD) of two integers. The GCD is the largest integer which evenly divides both numbers. That is, for two numbers I and J, the GCD is the largest number which produces a zero remainder when divided into both I and J. For example, the GCD of 21 and 35 is 7. Your program should read pairs of whole (non-zero) numbers from the user. The user can choose how many pairs he/she would like to input. Compute GCD for each pair of whole numbers entered by the user. Output should be displayed as follows:

Number 1 Number 2 GCD
Number 1 Number 2 GCD
Number 1 Number 2 GCD

Thoroughly test the program.

Hint: The *Greatest Common Divisor*, GCD for short, of two positive integers can be computed with Euclid's division algorithm. Let the given numbers be **a** and **b**, **a >= b**. Euclid's division algorithm has the following steps:

1. Compute the remainder **c** of dividing **a** by **b**.
2. If the remainder **c** is zero, **b** is the greatest common divisor.
3. If **c** is not zero, replace **a** with **b** and **b** with the remainder **c**. Go back to step (1).

Assignment instructions:

Assignment instructions

Before starting, review the top-level PSP1 process script below to ensure that you understand the "big picture" before you begin. Also, ensure that you have all of the required inputs before you begin the planning phase.

PSP1 Process Script

Purpose	To guide the development of module-level programs
Entry Criteria	- Problem description - Blank PSP1 Project Plan Summary form - Blank Size Estimating worksheet and PSP Design Form - Historical size and time data from your previous activities - Blank Time and Defect Recording logs - Defect Type and size counting standards - Stopwatch (optional)

Step	Activities	Description
1	Planning	- Follow the attached planning script.
2	Development	- Follow the attached development script.
3	Postmortem	- Follow the attached postmortem script.

Exit Criteria	- A thoroughly tested program - Completed Project Plan Summary form with estimated and actual data - Completed Size Estimating Worksheet - Completed Time and Defect Recording logs

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Planning phase Plan your program following the PSP1 planning phase script.

PSP1 Planning Script

Purpose	To guide the PSP planning process
Entry Criteria	- Problem description - Blank PSP1 Project Plan Summary form - Blank Size Estimating worksheet - Historical size and time data from your previous PSP activities - Blank Time and Defect Recording logs

Step	Activities	Description
1	Form Setup	- Complete form headers. - Enter start time for PLAN phase in Time Recording Log.
2	Program Requirements	- Produce or obtain a requirements statement for the program. - Ensure that the requirements statement is clear and unambiguous. - Resolve any questions.
3	Size Estimate	- Produce a program conceptual design. - Use the informal estimation procedure to estimate the size of this program. - Complete the size estimating worksheet.
4	Resource Estimate	- Follow the directions for completing the planning portion of the Project Summary form. - Enter the stop time for the PLAN phase in the Time Log.

Exit Criteria	- Documented requirements statement. - Program conceptual design. - Completed Size Estimating Worksheet - Project Summary form contains estimated program size and development time data. - Time recording log contains entry for PLAN phase. - Defect Recording log header completed.

Verify that you have met all of the exit criteria for the planning phase, **then** proceed to the development phase.

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Development phase

Develop the program following the PSP1 development phase script.

PSP1 Development Script

Purpose	To guide the development of small programs
Entry Criteria	- Same as exit criteria from Planning Script. - Blank PSP Design Form.

Step	Activities	Description
1	Design	- Record start time in the Time Recording Log. - Review the requirements and produce a design to meet them. - Record any design work you do in the PSP Design form. - Record in the Defect Recording log any requirements defects found. - Record time in the Time Recording log.
2	Code	- Record start time in the Time Recording Log. - Implement the design. Write the entire source code for the solution. - Record in the Defect Recording log any requirements or design defects found. - Record time in the Time Recording log.
3	Compile	- Record start time in the Time Recording Log. - Compile the program until error-free. - Fix all defects found. - Record defects in the Defect Recording log. - Record time in the Time Recording log.
4	Test	- Record start time in the Time Recording Log. - Test until all tests run without error. - Fix all defects found. - Record defects in the Defect Recording log. - Record time in the Time Recording log.

Exit Criteria	- A thoroughly tested program. - Completed PSP Design Form. - Time Log entries for Plan through Test Phases. - Completed Defect Recording log.

Verify that you have met all of the exit criteria for the development phase, then proceed to the postmortem phase.

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Assignment instructions, Continued

Postmortem phase

Conduct the postmortem following the PSP1 postmortem script.

PSP1 Postmortem Script

Purpose	To guide the PSP postmortem process
Entry Criteria	- Same as exit criteria from Development Script.

Step	Activities	Description
1	Defect Recording	- Review the Project Plan Summary to verify that all of the defects found in each phase were recorded. - Using your best recollection, record any omitted defects.
2	Defect Data Consistency	- Record start time for Postmortem in the Time Recording Log. - Check that the data on every defect in the Defect Recording log are accurate and complete. - Verify that the numbers of defects injected and removed per phase are reasonable and correct. - Using your best recollection, correct any missing or incorrect defect data.
3	Defect Summarizing	- Summarize defect tally data on the Project Summary Form.
4	Size	- Count the size of the completed program using LOC counter. Don't count comments. - Enter this data in the Project Summary form.
5	Time	- Review the completed Time Recording log for errors or omissions. - Using your best recollection, correct any missing or incomplete time data. - Compute the delta time for all completed log entries. - Guess how long it will take to complete the Project Summary calculations and enter you guessed stop time in the Time Log. Compute the delta time. - Summarize time data on Project Summary form. - Finish remaining calculations on Project summary form.

Exit Criteria	- A thoroughly tested program - Completed Project Plan Summary form - Completed Time and Defect Recording logs

Verify that you have met all of the exit criteria for the PSP1 postmortem phase, then submit your assignment.

Submitting your assignment

When you've completed the postmortem phase, submit your assignment via Blackboard. The submission package should have the following:

- PSP1 Project Plan Summary form
- PSP Estimation worksheet
- PSP Design form
- Time Recording log
- Defect Recording log
- Source code (java program; just the .java file(s);)

Guidelines and evaluation criteria

Evaluation criteria

Your process report must be
- complete
- legible
- in the specified order

Your process data must be
- accurate
- precise
- self-consistent

Suggestions

Keep your programs simple. You will learn as much from developing small programs as from large ones.

If you are not sure about something, ask your instructor for clarification.

Software is not a solo business, so you do not have to work alone.
- You must, however, produce your own estimates, designs, code, and completed forms and reports.
- You may have others review your work, and you may change it as a result.
- You should note any help you receive from others in your process report. Log the review time that you and your associates spend, and log the defects found or any changes made.