14.XX Fall 2021: Problem Set 1
Name of the Subject
Instructor(s): John Doe, Jane Roe

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Due Date: 2021-09-01

Problem 1 [5 points, Generic Textbook 0.1]

This is a pset template made by Paolo Adajar (paoloadajar@mit.edu) in Summer 2021. I intend to use this template throughout grad school for consistent-looking psets (both for classes I take and classes I am TA for). It includes environments for problems, solutions, and personal reflections.

Problem text be written using the `problem` environment. To display the problem source and number of points, you can use the command \points[source]{num-points}; it is demonstrated above. The argument [source] is optional. I recommend denoting each problem using \section*{Problem n \points[source]{num-points}}.

This template with many pre-installed packages, including:

- `amsmath`, `amsthm`, `amsfonts`, `amssymb`, and `physics` for formatting math,

- `natbib` for citations,

- `graphicx`, `tabularx`, `caption`, `subcaption`, and more for formatting, and

- `version` for excluding problems using \excludeversion{problem} (with similar commands for both solutions and reflections).

To use this package, add \input{paolo-pset.tex} to the preamble. Additionally, using \newcommand, define \name, \email, \classname, \subject, \instructor, \assignment, and \duedate. Optionally, define \collaborators.

(a) [4 points] This is the text of the first subproblem, which also uses the `problem` environment. The \points command can be passed as an optional argument to the `problem` environment to denote the number of points, using the syntax \problem{\points[source]{num-points}}. This is recommended for subproblems.

> SOLUTION: This is the `solution` environment. It can include both inline math, like $E = mc^2$, and display math text:
>
> $$\sum_{i=1}^{\infty} i = 1 + 2 + 3 + \cdots = -\frac{1}{12}$$
>
> The box that surrounds the `solution` environment will continue across a page break (if needed), as demonstrated with this solution.
>
> Solutions can also use theorems and proofs, following the `amsthm` package, such as

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[1]Collaborator(s): Alyssa P. Hacker (`aphacker`), Ben Bitdiddle (`bitdiddle`)

Theorem 1 (Pythagoras). For a right triangle with legs of lengths a and b and hypotenuse of c,
$$a^2 + b^2 = c^2.$$

Proof. Intermediate proofs will end with an empty box (`\square`). □

After intermediate theorems and proofs, you're ready to end your solution. The end of your solution will be marked with a black box. If your solution ends with a `displaymath`, `enumerate`, or `itemize` environment, use `\qedh` to end it with a black box without adding extra space at the end. (This is a modified version of `\qedhere` from `amsthm`). ■

REFLECTIONS: This `reflection` environment, as expected, is used for reflections on solutions. Examples of things to include include:

- Failed solution paths taken

- How the correct solution was found

- What point this question has, pedagogically (and any concepts that were missed)

- Related problems that may be interesting, useful, or cool

The hope is that these reflections will help with my own understanding of this content.

(b) [1 point] Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed in hendrerit diam. Curabitur quis metus facilisis, consectetur magna nec, dictum nulla. Ut vel lorem magna. Phasellus tristique mauris id leo varius commodo ac eget orci. Etiam ultricies, arcu id accumsan lobortis, mi purus luctus urna, a mattis felis odio sit amet risus. Vivamus suscipit sit amet ante sed volutpat. Sed bibendum egestas porta.

SOLUTION: Suspendisse laoreet ultrices hendrerit. Aenean accumsan ipsum metus, vel venenatis urna volutpat a. Vestibulum feugiat tincidunt metus, id bibendum lectus lacinia interdum. Etiam vitae purus a ante tempus cursus nec non elit. Proin sollicitudin ipsum non tincidunt venenatis. Mauris euismod massa quam, ut volutpat dui pharetra non. Curabitur bibendum a leo nec tristique. Aenean eu aliquam nisi. Proin lobortis nisi non nisi condimentum tempor. Donec a elementum ligula, ut consequat velit. Mauris vitae gravida nisi. Nunc convallis feugiat molestie. Curabitur sed ex hendrerit, tincidunt odio a, tincidunt sapien. ■

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Problem 2

(a) Text of problem.

> SOLUTION: Text of solution. ∎

> REFLECTIONS: Text of reflection.

(b) Text of problem.

> SOLUTION: Text of solution. ∎

> REFLECTIONS: Text of reflection.

(c) Text of problem.

    (i) Text of subproblem.

> SOLUTION: Text of solution. ∎

> REFLECTIONS: Text of reflection.

    (ii) Text of subproblem.

> SOLUTION: Text of solution. ∎

> REFLECTIONS: Text of reflection.

    (iii) Text of subproblem.

SOLUTION: Text of solution. ∎

REFLECTIONS: Text of reflection.