Conference Paper Title*

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Abstract—This research paper examines the differences and similarities between two algorithms Dynamic Programming and Greedy algorithms applied for security and registration systems. A password generator implemented using Dynamic Programming that enforces complex constraints, and a greedy-based license plate checker optimized for real time validation. The Dynamic Programming technique calculates subproblems in advance to examine all possibilities as effectively as possible, whereas the Greedy strategy focuses on rapid evaluations for immediate decision-making. The comparative analysis highlights the balance between thorough exploration and execution speed in algorithm design. Index Terms—Dynamic Programming, Greedy Algorithms, Password Generation, License Plate Validation, Algorithm Complexity

I. INTRODUCTION

Password generation and license plate validation represent critical tasks requiring different algorithms approaches. Password systems are usually more intricate, and they require adherence to security policies or constraints, forcing them to do exhaustive exploration of all possibilities. In contrast, license plate validation requires rapid, heuristic-based checks. This paper compares two implementations: 1) Password Generation using Dynamic programming with memorization 2) License Plate Checker using Greedy heuristics Contributions include: • A DP password generator that ensures rule compliance through systematic state exploration • A Greedy license plate validator optimized for real-time performance • Complexity analysis for comparison

II. LICENSE PLATE

A. By Greedy approach

Greedy algorithms are gives the locally optimal solution it does not use all the possible solution and does not visiting past decisions. immediately select the best available option.

III. PROBLEM STATEMENT

The challenge is to process and rewrite it correctly so that it remains valid according to the plate constructs. The user should enter a plate and make sure if it valid plate in the format ABC-1234 use a greedy approach to complete it with a suitable constrains or to correct the input the user input

A. Valid License Plate Format

The system is designed to follow a standardized license plate structure with the following rules:
• The plate should start with three uppercase alphabetical characters, without writing the letters I, O, and Q To avoid visual error.
• And hyphen (-)to separate between letters and numbers.
• The last part of the plate will be numbers made up of four, ranging from 0 to 9.

```cpp
bool isForbiddenChar(char c) {
    c = toupper(c);
    return c == 'I' || c == 'O' || c == 'Q';
}
```

Fig. 1: An example of a forbidden letters plate format.

B. Methodology:

There are a function that use greedy approach to complete the plate with the valid License format . The completePlate function is used so that if the user enters it incorrectly or if there is a letter or number missing, he can replace it with a number or a letter and hyphen in between.First, there are for loop searching for the 3 alphabetic characters without forbidden characters (I,Oand Q).if the letter is valid it directly added to the plate in uppercase format , if there are a missing letters it will be replaced by default letter "A" . And a hyphen(-) if it missing it can be replaced . Secondly, the function search for 4 digits. Similarly, if fewer than four digits then the missing can be replaced by default digit "0".

C. Complexity Analysis

the completeplate function iterates twice over the user input string of length n . first to extract valid letters and second to extract digits so the complexity will be o(n). Additional operations ,such as missing the character or digit is o(1). . The isValidPlate function confirm the format of the license plate and it is o(1)

the overall time complexity is o(n). the space complexity is o(1) because there are affixed size always 8 characters.

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Function	Time Complexity	Space Complexity
`completePlate()`	$O(n)$	$O(1)$
`isValidPlate()`	$O(1)$	$O(1)$
Overall	$O(n)$	$O(1)$

TABLE I: Time and Space Complexity of License Plate Functions

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Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

D. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [7].

E. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

F. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

G. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 2", even at the beginning of a sentence.

TABLE II: Table Type Styles

Table Head	Table Column Head		
	Table column subhead	*Subhead*	*Subhead*
copy	More table copy[a]		

[a]Sample of a Table footnote.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of

Fig. 2: Example of a figure caption.

quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

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REFERENCES

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first ..."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [4]. Papers that have been accepted for publication should be cited as "in press" [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

REFERENCES

[1] G. Eason, B. Noble, and I. N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955.

[2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[3] I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[4] K. Elissa, "Title of paper if known," unpublished.

[5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[7] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.