**Password Generator Project**

**Assignment:** Design an algorithm that can generate a custom, reproducible password that is uniquely different for each website.

Working in pairs, your task is to design and construct a standardized strategy for generating unique passwords for different sites that can later be regenerated by reapplying the same algorithm. Your solution should address the following concepts:

- The algorithm should generate different passwords for different sites.

- The password for any site should be reproducible simply by following the algorithm.

- The algorithm should be easy to remember and apply.

- The password should be complex and difficult to guess.

- The general algorithm should not be easily deduced from the password.

Once you’ve designed your solution, write out each step of your password-generating algorithm in some form of pseudocode. No specific format is required for your algorithm, but your pseudocode should be clear enough and detailed enough that anyone who is not familiar with how your algorithm is supposed to work can still follow along and apply its steps in generating a valid password.

Your submission will be in the form of a written algorithm (i.e., pseudocode) that explicitly states each of the discrete steps and decisions that must be made in generating a valid password. Also, you must provide at least five examples of passwords that your algorithm would generate for five different sites. One of those examples must be thoroughly annotated, showing how each step of the algorithm contributes to the final password.

Your solution and examples should demonstrate the following properties:

- Clear and readable

- Cleanly formatted

- Appropriate use of sequencing, selection, and/or iteration

- Well-documented examples

**Example:**

1) Abbreviate the site into a 2-letter phrase.

2) Capitalize the site abbreviation.

3) Type the site abbreviation.

4) Type the number of letters in the site name.

5) Identify the verb that describes how you use the site.

6) Remove all vowels from the verb.

7) Type the vowel-less verb in lowercase letters.

8) Identify the subject or type of content for the site.

9) Capitalize the subject or type of content.

10) Type the capitalized subject or type of content.

“Facebook is where I post to my friends.” ... FB8pstBFFS

“Gmail is where I read my mail.” ... GM5rdMAIL

“Twitter is where I follow my friends.” ... TW7fllwBFFS

“YouTube is where I watch videos.” ... YT7wtchVIDEOS

**Template**

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Class: AP Computer Science Principles

Teacher: Mr. Myers

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Unit 1 Project

Password Generator Algorithm

Step 1: Take the last 5 characters of the site

\*If there are less than 5 characters, use the whole title

Step 2: Swap the first 2 and last two characters

\*if there are less than two characters, don’t do anything

Step 3: Swap the first and last letters into numbers and vice versa (a=1, b=2, etc.)

\*If there are any non number/letter characters, substitute them with the number of letters it takes to spell it (dash=4)

Step 4: Bring the middle character to the end

\*If there are an even amount of characters, bring the middle two to the front

\*If there are two or less characters, don’t do anything

Step 5: Bring any remaining letters in the middle to the front

Step 6: Flip the domain (com=moc) and add it to the front of the password

Step 7: Move all characters up by the amount of vowels in the site

\*If the number exceeds 9 and the letter exceeds z, reset from the beginning (z→ a, 9 → 0)

Step 8: Capitalize the frontmost (leftmost) letter

Step 9: If you found this site on your own put a ! at each end of the password. If you were recommended the site by a friend, put ‘ at each end.

\*If the site doesn’t allow symbols, put a 1 in place of ! and 0 in place of ‘.

Annotated Example:

Website address: Facebook

Step 1:

ebook

Step 2:

koobe

Step 3:

11oob5

Step 4:

11ob5o

Step 5:

ob1150

Step 6:

mocob115o

Step 7:

qsgsf5559s

Step 8:

Qsvsf5559s

Step 9:

!Qsvsf5559s!

Or

1Qsvsf5559s1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Instagram | Skype | Twitter | Myspace | Steam |
| Step 1 | agram | skype | itter | space | Steam |
| Step 2 | marga | epyks | retti | ecaps | maets |
| Step 3 | 13arg1 | 5pyk19 | 18ett9 | 5cap19 | 13aet19 |
| Step 4 | 13g1ar | 5p19yk | 18t9et | 5c19ap | 13at19e |
| Step 5 | g131ar | p519yk | t189et | c519ap | at1319e |
| Step 6 | mocg131ar | mocp519yk | moct189et | mocc519ap | mocat1319e |
| Step 7 | prfj464du | npdq620zl | pqgev201gv | pqgg731cr | pqea3531g |
| Step 8 | Prfj464du | Npdq620zl | Pqgev201gv | Pqgg731cr | Pqea3531g |
| Step 9 | !Prfj464du!  OR  1Prfj464du1 | !Npdq620zl!  OR  1Npdq620zl1 | ‘Pggey201gy’  OR  0Pqgev201gv | ‘Pqgg731cr’  OR  0Pqgg731cr0 | !Pqea3531g!  OR  1Pqea3531g1 |

**Rubric**

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| --- | --- | --- | --- | --- |
| Content Area | Performance Quality | | | |
| Readability | Algorithm is typed, organized, and nicely formatted for easy use. | Algorithm is organized and nicely formatted for easy use, but is not typed.  —OR—  Algorithm is typed, but the formatting and organization makes it somewhat difficult to use. | Algorithm has formatting and organization that makes it somewhat difficult to use AND is not typed.  —OR—  Algorithm may be typed, but the formatting and organization makes it extremely difficult to use. | Not enough criteria are met in order to award any credit. |
| Flow | The algorithm incorporates the appropriate use of all three types of programming structure: sequencing, selection, and iteration. | The algorithm incorporates the appropriate use of only two types of programming structure: sequencing, selection, and iteration. | The algorithm incorporates the appropriate use of only one type of programming structure: sequencing, selection, and iteration. | Not enough criteria are met in order to award any credit. |
| Correctness | The algorithm generates a unique and reproducible password for all sites. | The algorithm generates a reproducible password for all sites, however, some may not be unique.  —OR—  The algorithm generates a unique and reproducible password for most sites.  —OR—  The algorithm generates a unique password for all sites, however, it is not reproducible. | The algorithm generates a password for all sites, however, some may not be unique or reproducible.  —OR—  The algorithm generates a unique and reproducible password for only a few sites. | Not enough criteria are met in order to award any credit. |
| Effectiveness | The algorithm cannot be easily deduced from just the password and the name of the site. | A few parts of the algorithm can be easily deduced from just the password and the name of the site. | Most parts of the algorithm can be easily deduced from just the password and the name of the site. | Not enough criteria are met in order to award any credit. |
| Examples | There are five sample passwords generated correctly based on the algorithm. | There are four sample passwords generated correctly based on the algorithm. | There are three or fewer sample passwords generated correctly based on the algorithm. | Not enough criteria are met in order to award any credit. |
| Documented Case | There is one annotated example documented at all steps of the process.  —AND—  It is well formatted and organized and easy to follow. | There is one annotated example documented at most steps of the process AND It is well formatted and organized and easy to follow.  —OR—  There is one annotated example documented at all steps of the process, but the organization and formatting makes it difficult to follow. | There is one annotated example documented at some steps of the process AND It is well formatted and organized and easy to follow.  —OR—  There is one annotated example documented at all steps of the process, but the organization and formatting makes it extremely difficult to follow.  —OR—  There is one annotated example documented at most steps of the process, but the organization and formatting make it difficult to follow. | Not enough criteria are met in order to award any credit. |