PROGRAMMING BASED PLATFORM ASSIGNMENT

IMPLEMENTATION OF MODULARIZATION AND NPM PACKAGE PUBLICATION

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1. **Introduction: The Concept of Modularization**

   Modularization is an approach in software development where program code is divided into smaller, independent parts called modules. Each module is designed to perform a specific function, making it easier to manage, test, and maintain.

   In the context of Node.js, modularization is a fundamental concept that allows us to:

   - Organize Code: Keep files from becoming too large and complex by separating functionalities into different files.
   - Improve Readability: Code becomes easier to understand because it is structured by function.
   - Encourage Reusability: The same module can be imported and reused in various parts of the application or even in other projects.
   - Isolate Scope (Encapsulation): Variables and functions inside a module are local (not global), preventing naming conflicts with other modules.

   Node.js uses the CommonJS module system, which works with two main commands:

   - **module.exports** to expose or provide functions/data from a module.
   - **require( )** to import or use those functions/data in another file.

2. **Project Structure: Calculator Package**

   This project aims to create a simple calculator package that can be published to NPM. Its structure is designed to be easily used by other developers.

   The structure:
   Week_05
   - index.js
   - penjumlahan.js
   - pengurangan.js
   - perkalian.js
   - pembagian.js
   - package.json

   penjumlahan.js, pengurangan.js, perkalian.js, pembagian.js:

   - Each file is an independent module containing only one mathematical function.
   - These functions are exported using module.exports.

index.js:

This is the main entry point of the package. It imports the four operation modules above and re-exports them in a single object. Thiss way, users only need to import this file once to access all functionalities.

package.json:

Contains essential information about the package such as name, version, description, and main file ("main": "index.js").

3. **Implementation and NPM Publication Process**
   The steps taken to create and publish this package are as follows:

   Project Initialization:
   The project was initialized using npm init -y to create a basic package.json file.

   Module Creation:
   The four functional modules (penjumlahan.js, etc.) were created. Each module exports one arrow function.

   Entry Point Creation:
   The index.js file was created to combine all modules into a single export, simplifying package usage.

   package.json Configuration:
   The package.json file was edited to add important metadata such as description, keywords, author, and license. The package name was chosen in a scoped format (@adambastian/calculator) to make it unique.

   NPM Login:
   Logged into the NPM account through the terminal using the npm login command.

   Publication Process:
   The command npm publish was initially executed, but resulted in the error E402 Payment Required.

   This occurred because NPM treats scoped packages (those starting with @username/) as private by default, which requires a paid subscription.

   Publication Solution:
   To resolve this issue and publish the package publicly and for free, the command was modified to **npm publish --access public**
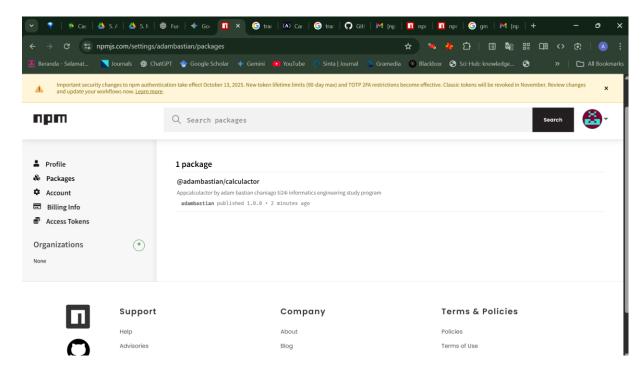
   The --access public flag explicitly tells NPM to register the package as a public package, even if it is scoped.

4. **Execution Proof**
   Below are screenshots showing the successful implementation process:

Screenshot of Successful Publication:

```
C:\Users\Axioo Hype 7\OneDrive\Documents\js_learning\week_05> npm publish --access public
ugger attached.
 notice
 notice    @adambastian/calculactor@1.0.0
 notice Tarball Contents
 notice 978B index.js
 notice 380B package.json
 notice 71B pembagian.js
 notice 75B pengurangan.js
 notice 76B penjumlahan.js
 notice 71B perkalian.js
 notice Tarball Details
 notice name: @adambastian/calculactor
 notice version: 1.0.0
 notice filename: adambastian-calculactor-1.0.0.tgz
 notice package size: 764 B
 notice unpacked size: 1.7 kB
```

Screenshot of Package Usage in Another Project: