Assignment 1: Python Program for Decimal to Hexadecimal Conversion

Objective:

Create a Python program that converts a given decimal number (base 10) into its equivalent hexadecimal number (base 16). The decimal number system uses the digits 0-9, while the hexadecimal number system uses the digits 0-9 and the letters A-F.

Examples:

- Input: `10`
  - Output: `A`
- Input: `2545`
  - Output: `9F1`

Steps to Implement the Program:

1. **Define the Conversion Function**:
   - Create a function named `decimal_to_hexadecimal` that takes a decimal number as input and returns its hexadecimal representation.
2. **Use Python's Built-in Function**:
   - Utilize Python's built-in `hex()` function to convert the decimal number to a hexadecimal string.
   - Remove the '0x' prefix that Python adds by default.
   - Convert the resulting string to uppercase to ensure it matches the standard hexadecimal format.
3. **Handle User Input**:
   - Read the decimal number input from the user.
   - Convert the input to an integer.
   - Handle any invalid inputs gracefully using a try-except block.
4. **Display the Result**:
   - Print the hexadecimal representation of the input decimal number.

Python Code:

```
def decimal_to_hexadecimal(decimal_number):
    # Convert decimal number to hexadecimal and remove the '0x' prefix
    hexadecimal_number = hex(decimal_number)[2:].upper()
    return hexadecimal_number


# Example usage
if __name__ == "__main__":
    try:
        decimal_input = int(input("Enter a decimal number: "))
        hex_output = decimal_to_hexadecimal(decimal_input)
        print(f"Hexadecimal representation: {hex_output}")
    except ValueError:
        print("Please enter a valid integer.")
```

Explanation:

1. **Function Definition (`decimal_to_hexadecimal`)**:
   - This function takes a decimal number as its parameter.
   - It uses `hex(decimal_number)` to convert the decimal number to hexadecimal.
   - The `hex()` function returns a string prefixed with '0x', which is sliced off using `[2:]`.
   - The result is converted to uppercase with `.upper()` to match the standard hexadecimal format.
2. **Example Usage**:
   - The `if __name__ == "__main__":` block ensures the script can be run directly.
   - The user is prompted to enter a decimal number.
   - The input is converted to an integer.
   - If the user input is invalid (not an integer), a ValueError is caught, and an error message is displayed.

By following these steps, you can create a Python program that efficiently converts a decimal number to its hexadecimal equivalent. This program can handle various decimal inputs and provides the correct hexadecimal output.

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