PROGRAM 8

QUESTION:

Write a program to convert a decimal number to its equivalent octal number.

Specifications:

Class Name – Ocatdeci

Instance Variable:

int oct – to store the decimal number int deci – to store the octal number

Member Methods:

Octadeci (int nn) – to initialize oct = nn and deci with its default value.

int convert (int ) – will convert the number to its decimal equivalent.

void display() – to display the equivalent octal number.

Implement main() function to create object and call the above methods.

**ALGORITHM:**

1. Start
2. Define a class named `Octadeci`.
3. Declare instance variables `oct` (octal input) and `deci` (decimal equivalent) as integers.
4. Create a constructor `Octadeci(int nn)`:

* Initialize the `oct` instance variable with the input `nn`.
* Initialize the `deci` instance variable with 0.

Algorithm for the `convert` Method:

1. Start the `convert` method with a parameter `n`.
2. Initialize a variable `s` to 0 and a variable `x` to 0.
3. While `n` is not equal to 0, do the following:

* Calculate the remainder `rem` of `n` divided by 10.
* Calculate the contribution of the current digit by multiplying `rem` with 8 raised to the power of `x` (i.e., `(int)Math.pow(8, x) \* rem`) and add it to `s`.
* Increment the value of `x`.
* Update the value of `n` by dividing it by 10.

4. Return the value of `s`.

Algorithm for the `display` Method:

1. Convert the octal number (`oct`) to its decimal equivalent using the `convert` method.
2. Update the `deci` instance variable with the octal equivalent.
3. Display the octal equivalent using the `deci` instance variable.

Algorithm for the `main` Method:

1. Initialize a `Scanner` object `sc` to read user input.
2. Prompt the user to enter an octal number.
3. Read the decimal number using `sc.nextInt()` and store it in the variable `octal`.
4. Create an instance of the `Ocatdeci` class, named `obj`, with `octal` as the argument to the constructor.
5. Call the `display` method on the `obj` instance to convert and display the octal equivalent. END.

**VARIABLE DESCRIPTION TABLE**

|  |  |  |
| --- | --- | --- |
| Variable Name | Data Type | Description |
|  |  |  |
| deci | int | Stores the decimal |
|  |  | equivalent of the |
|  |  | octal number. |
|  |  |  |
| oct | int | Stores the octal |
|  |  | number provided by |
|  |  | the user. |
|  |  |  |
| nn | int | Temporary variable |
|  |  | for constructor |
|  |  |  |
| octal | int | Stores the octal |
|  |  | number entered by |
|  |  | the user. |
|  |  |  |
| n | int | Represents the |
|  |  | current digit being |
|  |  | processed within |
|  |  | the `convert` |
|  |  | method. |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| rem | int | Stores the |
|  |  | remainder when |
|  |  | dividing `n` by 10 in |
|  |  | the `convert` |
|  |  | method. |
|  |  |  |
| s | int | Holds the sum of |
|  |  | contributions of |
|  |  | each octal digit to |
|  |  | the decimal |
|  |  | equivalent within |
|  |  | the `convert` |
|  |  | method. |
|  |  |  |
| x | int | Keeps track of the |
|  |  | current position |
|  |  | (power of 8) when |
|  |  | converting each digit |
|  |  | within the |
|  |  | `convert` method. |
|  |  |  |
| sc | Scanner | Scanner object for |
|  |  | user input |
|  |  |  |
| obj | Ocatdeci | Instance of the |
|  |  | `Ocatdeci` class |
|  |  |  |