420-AP1-AS - ALGORITHMS AND PROGRAMMING – COMPUTER SCIENCE TECHNOLOGY – PROGRAMMING
Section 07218

ASSIGNMENT 9 – Functions

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Assignment 9 – Functions

For the following exercises:

- Create a new project called “Assignment9” into your solution “AP1_2023”
- Send only the “.cs” file
- You must validate entries from the console.
- You must use functions.
- Test all your functions calling them from the main function.

Exercises:

Your task is to write the function definition for the following functions. All the functions are to be written in a single source file, using the declarations provided here.

1. Write a function that takes a year as input, and returns whether or not it is a leap year. No input validation required.

   ```
   bool isLeapYear(int year);
   ```

2. Write a function that takes as input a month and a year (represented as integers), and returns the number of days in that month. Use `isLeapYear()`.
   ```
   int getDaysInMonth(int month, int year);
   ```

3. Write a function that takes 2 integers “a” and “b”, and returns the larger of the 2 integers.

   ```
   int max(int a, int b);
   ```

4. Write a function that takes as input 3 integers `n`, `min` and `max`, and displays `n` if it falls between `min` and `max`. Otherwise, it should display an error message.
5. Write a function that calculates $base^{exponent}$ for real base and integer exponent.

   ```
   double power(double base, int exponent);
   ```

   Note: Use your own logic (not the C# functions) to get the power of a number. Hint: you can get it using a mathematical operation.

6. Write a function that returns a real number x rounded to a precision of n decimal digits (10-n precision). Use the power function you made in the previous function to help you.
   Example: round(3.14159, 4) returns 3.1416 and round(-1.83, 1) returns -1.8.

   ```
   double round(double x, int n);
   ```

7. Write a function that takes an integer toCheck and returns true if toCheck is a prime number, and false if not.

   ```
   bool isPrime(int toCheck);
   ```

8. Write a function that takes as input an integer and returns the number of digits in the integer.

```
int countDigits(int n);
```

9. Write a function that takes as arguments two triplets day1, month1, year1, and day2, month2, year2, representing two dates, and that determines whether the first date comes before the second. Use isLeapYear function.

```
bool firstDayEarlier(int day1, int month1, int year1, int
day2, int month2, int year2);
```

10. Write a function that takes as input a date (3 integers: day, month, year) and that displays the date of the next day (in numbers). Use `isLeapYear()` in the code of this function.

```
void displayTomorrow(int day, int month, int year);
```