University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

MID-MODULE TEST, 5 OCTOBER 2021

COMP 10280

Programming I (Conversion)

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Time allowed: 1 hour.

Instructions for Candidates

Answer both questions.

Students should write programs in Python 3.
Pseudocode for algorithms should be included with programs.

1. Write a program that prompts the user for a number (an integer) and uses a `while` loop to calculate the number of integers up to and including that number that are evenly divisible by 4, 5, 7 and 13. The program should print out an error message if a negative number is entered.

   Sample outputs from this program are as follows (each output represents a separate execution of the program, ie the program prompts for a single number, processes it and exits):

```
Program to calculate the number of integers evenly divisible by 4, 5, 7 and 13

Enter a non-negative integer:  12
You entered:  12
Number of numbers up to and including 12 evenly divisible by 4:  3
Number of numbers up to and including 12 evenly divisible by 5:  2
Number of numbers up to and including 12 evenly divisible by 7:  1
Number of numbers up to and including 12 evenly divisible by 13:  0
Finished!
```

```
Program to calculate the number of integers evenly divisible by 4, 5, 7 and 13

Enter a non-negative integer:  0
You entered:  0
Number of numbers divisible by 3:  0
Number of numbers divisible by 5:  0
Number of numbers divisible by 7:  0
Number of numbers divisible by 11:  0
Finished!
```

```
Program to calculate the number of integers evenly divisible by 4, 5, 7 and 13

Enter a positive integer:  200
You entered:  200
Number of numbers up to and including 200 evenly divisible by 4:  50
Number of numbers up to and including 200 evenly divisible by 5:  40
Number of numbers up to and including 200 evenly divisible by 7:  28
Number of numbers up to and including 200 evenly divisible by 13:  15
Finished!
```

```
Program to calculate the number of integers evenly divisible by 4, 5, 7 and 13

Enter a positive integer:  -200
You entered:  -200
Number entered should be >= 0.
Finished!


Program to calculate the number of integers evenly divisible by 4, 5, 7 and 13

Enter a positive integer:  10000
You entered:  10000
Number of numbers up to and including 10000 evenly divisible by 4:  2500
Number of numbers up to and including 10000 evenly divisible by 5:  2000
Number of numbers up to and including 10000 evenly divisible by 7:  1428
Number of numbers up to and including 10000 evenly divisible by 13:  769
Finished!
```

[15 marks]

2. The 2021–2022 academic year for a particular university is from 1 August 2021 to 31 July 2022. Write a program that prompts the user for a series of days (integer numbers) and, for each day, prints out the date, the month and the year in the 2021–2022 academic year of that day. The program should continue until a non-positive number is entered.

   Sample output from this program is as follows:

```
Program to calculate the date, month and year in the 2021-2022
academic year of a given day.

Enter the day for which you want to find the date (an integer):  1
You entered:  1
Day number 1 is 1 August 2021
Enter the day for which you want to find the date (an integer):  31
You entered:  31
Day number 31 is 31 August 2021
Enter the day for which you want to find the date (an integer):  32
You entered:  32
Day number 32 is 1 September 2021
Enter the day for which you want to find the date (an integer):  62
You entered:  62
Day number 62 is 1 October 2021
Enter the day for which you want to find the date (an integer):  365
You entered:  365
Day number 365 is 31 July 2022
Enter the day for which you want to find the date (an integer):  366
You entered:  366
Day number 366 is not in the 2021-2022 academic year!
Enter the day for which you want to find the date (an integer):  299
You entered:  299
Day number 299 is 26 May 2022
Enter the day for which you want to find the date (an integer):  154
You entered:  154
Day number 154 is 1 January 2022
Enter the day for which you want to find the date (an integer):  0
Finished!
```

   (For the removal of doubt, there are 30 days in each of the months of April, June, September and November, there are 28 days in February and there are 31 days in each of the other months of the year.)

[35 marks]