

Exercises: up to Chapter 9

The first set of exercises on methods are *based on* going back to exercises on previous sheets and turning them into methods. As well as being 'right' methods need to have sensibly-chosen parameters (number and type), and return values. Remember methods **should do one thing** - not several.

From Exercise Sheet up to Chapter 3

1. Turn your program that converts mm to inches into a method `mmToInches` - make sure it has the correct number and type of parameter(s), and returns the right type.
2. Remember the program that printed this:

```
+--+--+
|  |  |
+--+--+
|  |  |
+--+--+
```

Turn it into a method `printGrid` that accepts an integer parameter saying how many 'boxes' high and wide the shape should be (in the example above the value of the parameter is two). Extend your method so it takes *two* parameters - for length and width - so it can print rectangular (i.e. not just square) grids.

3. Write a method called `isEaster` that accepts three parameters - all integers - representing a year, a month, and a day. Your method should return true if the year, month and day correspond with Easter (the algorithm is on Exercise Sheet 1).
4. **Challenge** - do 3 but instead of integers representing year, month and day, the parameter should be a Java `Date` object.

From Exercise Sheet up to Chapter 4

5. Write a method `numDigits` that accepts an integer as a parameter and returns the number of digits it has (for example, 99 has 2, 1664 has 4).
6. **Challenge** - redo 5 above but with an additional parameter that represents the base to use for the number. So, for example, 99 in base 2 is 1100011, which is 7 'digits' long; 15 in base 16 is F, which is 1 'digit'. Remember that only certain integers are legal/sensible values for a base and do checks before any calculations.
7. Redo exercise 7 on the exercise sheet for chapter 4 as a method called `toGrade` which converts a letter grade to a UK university grade - think about the types you should use.
8. Similarly, redo exercise 8 on the same sheet as a method `toCardName` - again think about the types and error handling.
9. **Challenge** - actually should be quite easy by now! Redo exercise 16 on the chapter 4 sheet as a method `isBlack` that returns true if a chessboard square is black and false otherwise. Think about what parameters you should use.
10. Write a method `gcd` that computes the greatest common divisor of two numbers (integers) and returns it.
11. **Challenge** - actually not so much of one by now. Write a method called `isLegalCardNumber` that returns true if a credit card number is 'legal' (that is potentially valid). The algorithm to check this is in exercise 8 on the sheet for Chapter 6..
12. Write a `getInteger` method that reads in an integer from the keyboard without crashing - your method should keep asking for an integer until the user types one - ignoring all non-integer input. It should print appropriate messages to the user.
13. Extend your method from 12 above to only accept positive integers (≥ 0 in this case).
14. Extend your method from 13 above to allow the user to cancel by typing c (think carefully about what your method should return in this case).
15. Extend your method so that the strings printed for the user are passed as parameters; add a test program that demonstrates your method working in at least two different languages. If you are not bilingual, Google Translate is your friend - I'm not going to be fussy about minor translation errors.

Exercise Sheet up to Chapter 6

16. Write a method that converts an integer to a string representing the day of the week. You can choose if Sunday is day 1 or 7, but your method should do something sensible if you pass a parameter outside the range of 1 to 7.
17. Extend your program so that it accepts a second parameter which is a language name, and returns the name of the day of the week in the corresponding language - your method should work for at least two languages, one of which can be (but doesn't have to be) English. If you don't know any other languages, Google translate is again your friend but to start you off:

English	Welsh	Greek
Sunday	Dydd Sul	Κυριακή
Monday	Dydd Llun	Δευτέρα
Tuesday	Dydd Mawrth	Τρίτη
Wednesday	Dydd Mercher	Τετάρτη
Thursday	Dydd Iau	Πέμπτη
Friday	Dydd Gwener	Παρασκευή
Saturday	Dydd Sadwrn	Σάββατο