Exercise 2

Last update January 24, 2026

This exercise sheet must be handed in via LearnIt.

You solve and handin your assignment as a group.

Your names must be part of the filename, e.g., `FP-02-<name1>-<name2>.fsx`.

An example: `FP-02-MadsAndersen-HugoHansen.fsx`.

You can only upload one file and it must be of type `fs` or `fsx`.

It is important that you annotate your own code with comments. It is also important that you apply a functional style, i.e., no loops and no mutable variables.

You are not allowed to use any AI tooling.

Exercise 2.1 Write a function `dup:string->string` that concatenates a string with itself.

You can either use + or `^`. For example:

```
val dup : string -> string

> dup "Hi ";;
val it : string = "Hi Hi "
```

Exercise 2.2 Write a function `dupn:string->int->string` so that `dupn s n` creates the concatenation of `n` copies of `s`. For example:

```
val dupn : string -> int -> string

> dupn "Hi " 3;;
val it : string = "Hi Hi Hi "
```

Exercise 2.3 Assume the time of day is represented as a pair `(hh, mm):int*int`.

Write a function `timediff:int*int->int*int->int` so that `timediff t1 t2` computes the difference in minutes between `t1` and `t2`, i.e., `t2-t1`. A few examples:

```
val timediff : int * int -> int * int -> int

> timediff (12,34) (11,35);;
val it : int = -59
> timediff (12,34) (13,35);;
val it : int = 61
```

Exercise 2.4 Write a function `minutes:int*int->int` to compute the number of minutes since midnight. Easily done using the function `timediff`. A few examples:

```
val minutes : int * int -> int

> minutes (14,24);;
val it : int = 864
> minutes (23,1);;
val it : int = 1381
```

Exercise 2.5 Solve HR, exercise 2.2

Exercise 2.6 Solve HR, exercise 2.8

Exercise 2.7 Solve HR, exercise 2.9