Haskell — Vel Tech Exam 2018 P22600_en

1. Write a function *df* :: **Int** → **Int** that returns the double factorial of a natural number. The double factorial of n is denoted $n!!$ and is $n(n-2)(n-4)\ldots$.
2. Write a function *sumd* :: **Int** → **Int** that returns the sum of the digits of a natural number.
3. Write a function *dup* :: **[Int]** → **[Int]** that duplicates each element in a list.
4. Write a function *pal* :: **String** → **Bool** that tells if a string is a palindrome, ie, if it is equal to its reverse.
5. Write a function *apply2* :: $(a \to a) \to a \to a$ that applies a function twice to some parameter.

Sample input 1

```
df 0
df 1
df 2
df 3
df 10
df 11
df 13
```

Sample output 1

```
1
1
2
3
3840
10395
135135
```

Sample input 2

```
sumd 0
sumd 3
sumd 23
sumd 999
sumd 8756
```

Sample output 2

```
0
3
5
27
26
```

Sample input 3

```
dup [1,2,3]
dup []
dup [666]
dup [4,4,2,3,8,2]
```

Sample output 3

```
[1,1,2,2,3,3]
[]
[666,666]
[4,4,4,4,2,2,3,3,8,8,2,2]
```

Sample input 4

```
pal "abcba"
pal "xyzaz"
pal ""
pal "a"
pal "aa"
pal "aba"
pal "abb"
pal "abcdedcbz"
```

Sample output 4

```
True
False
True
True
True
True
False
False
```

Sample input 5

```
apply2 (+ 2.5) 10.5
apply2 (* 3) 4
apply2 ("hello " ++) "peter"
```

Sample output 5

```
15.5
36
"hello hello peter"
```

Problem information

Author : Jordi Petit
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