Mission 1

(1)

```
fun all (your, base) =
        case your of
                0 => base
                | _ => "are belong to us" :: all(your - 1, base)
```

all 函数的类型为 fn: int * string list -> string list

其中 your 为 int 型，base 为 string list 型

(2)

```
fun funny (f, []) = 0
  | funny (f, x::xs) = f(x, funny(f, xs))
```

funny 函数的类型为 fn: ('a * int -> int) * 'a list -> int

其中 f 函数的类型为 fn: 'a * int -> int，x 的类型为'a，xs 的类型为'a list

(3)

```
(fn x => (fn y => x)) "Hello, World!"
```

表达式的类型为函数 fn: 'b -> string

Mission 2-1

```
(* toInt: int -> int list -> int *)
(* REQUIRE: L 为 b（b>1）进制数的 int list 表示 *)
(* ENSURE: toInt b L 为其相应的整数值 *)
fun toInt b [] = 0
  | toInt b (x::L) = x + (b * (toInt b L));
```

```
(* 测试 *)
val base2ToInt = toInt 2;
base2ToInt [0,1];          (* 结果应为 2 *)
base2ToInt [1,0,1];        (* 结果应为 5 *)
```

```
Standard ML of New Jersey v110.75 [built: Sat Sep 29 12:51:13 2012]
- use "E:\\SML\\homework\\hw3-2-1.sml"
= ;
[opening E:\SML\homework\hw3-2-1.sml]
val toInt = fn : int -> int list -> int
val base2ToInt = fn : int list -> int
val it = 2 : int
val it = 5 : int
val it = () : unit
-
```

Mission 2-2

```
(* toBase: int -> int -> int list *)
(* REQUIRE: n 为 10 进制，且 n>=0,b>1 *)
(* ENSURE: toBase b n 将十进制数 n 转换为 b 进制数的
int list 形式 *)
fun toBase b 0 = []
    | toBase b n =
        let
            val (r,q) = (n mod b, n div b)
        in
            r::(toBase b q)
        end;


(* 测试 *)

toBase 5 42;              (* 结果应为[2,3,1] *)
```

```
- use "E:\\SML\\homework\\hw3-2-2.sml";
[opening E:\SML\homework\hw3-2-2.sml]
val toBase = fn : int -> int -> int list
val it = [2,3,1] : int list
val it = () : unit
-
```

Mission 2-3

```sml
(* convert: int * int -> int list -> int list *)

(* REQUIRE: b1,b2>1，L 为 b1 进制数的 int list 表示 *)

(* ENSURE: convert(b1,b2) L 将 b1 进制数的列表形式

 * 转换为 b2 进制数列表形式

 * 即满足 toInt b2(convert(b1,b2) L) = toInt b1 L

 *)
fun convert (b1,b2) L =
    let
        val n = toInt b1 L
    in
        toBase b2 n
    end;


(* 测试 *)

toInt 5 (convert(10,5) [2,4]) = toInt 10 [2,4];

(* 结果应为 true *)
```

```
- use "E:\\SML\\homework\\hw3-2-3.sml";
[opening E:\SML\homework\hw3-2-3.sml]
val convert = fn : int * int -> int list -> int list
val it = true : bool
val it = () : unit
-
```

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