



模块 4

活动：使用 **MSP432** 进行软件设计



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问题 1

写一个 C 语言函数，检查一个 ASCII 字符是否为字母，如果是字母的话返回真，否则返回假。ASCII 编码中字母位于 0x41 至 0x5A，以及 0x61 至 0x7A 之间。函数原型为

```
int bLetter(char data);
```

问题 2

写一个 C 语言函数，计算三个数字的平均值。三个数字的值作为输入会被传递给您的函数。函数原型为

```
int32_t Average(int32_t n1, int32_t n2, int32_t n3);
```

问题 3

写一个 C 语言函数，找出三个数字当中最大的一个。三个数字的值作为输入会被传递给您的函数。函数原型为

```
int32_t Max(int32_t n1, int32_t n2, int32_t n3);
```

问题 4

写一个 C 语言函数，计算以下一元二次等式

$$y = 2x^2 - 3x + 1$$

假设 x 和 y 都是 32 位数。假设 x 和 y 都是有符号 32 位定点数。某些 x 的值会导致 y 的值超出 32 位范围。确定不会导致溢出的最大 x 值，例如 $y < 2^{31}$ 。如果 x 的值导致溢出，返回 $y = 0x7FFFFFFF (2^{31}-1)$ 。再确定 x 的最小值，例如 $y > -2^{31}$ 。当 x 的值可能导致 y 值向下溢出时返回 $y = 0x80000000 (-2^{31})$ 。函数原型为

```
int32_t Quadratic(int32_t x);
```

问题 5

写一个 C 语言函数，计算两个点 $(x1, x2)$ 和 $(y1, y2)$ 之间的距离。

$$d = (x1-x2)^2 + (y1-y2)^2$$

假设 $x1$ 、 $x2$ 、 $y1$ 和 $y2$ 都是带符号 32 位定点数。您可以假设这些数字都足够小，不会导致溢出。函数原型为

```
int32_t SquareDistance(int32_t x1, int32_t y1,  
int32_t x2, int32_t y2);
```

问题 6

写一个 C 语言函数，当 $10 \leq x < 99$ 时返回真 ($R0=1$)，否则返回假 ($R0=0$)。函数原型为

```
int bTwoDigit(uint32_t x);
```

问题 7

无符号 32 位定点数的范围是 0 到 $2^{32}-1 (4294967295)$ 。写一个 C 语言函数，输入一个无符号 32 位定点数，返回一个代表它的十进制位数的位于 0 到 10 之间的值。例如，如果输入为 0 则返回 0，如果输入为 1-9 则返回 1，如果输入为 10-99 则返回 2，以此类推。函数原型为

```
uint32_t NumDigits(uint32_t x);
```

问题 8

写一个 C 语言函数，计算两个无符号 32 位定点数相乘的结果。函数需要进行溢出检测，即如果结果超过 $2^{32}-1$ ，函数返回 $0xFFFFFFFF (2^{32}-1)$ 。函数原型为

```
uint32_t Product(uint32_t n1, uint32_t n2);
```

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