模块 4

测验：使用 MSP432 进行软件设计

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问题 1 条件判断

写一个 C 语言函数，找到三个数字中的最小值。三个数字的值作为输入被传递给您的函数。函数原型为

```
int16_t Min(int16_t n1, int16_t n2, int16_t n3);
```

问题 2 条件判断

写一个 C 语言函数，判断一个 ASCII 字符的类型，如果该字符为十六进制数时返回真，否则返回假。ASCII 码中十六进制数位于 0x30 到 0x39，以及 0x41 到 0x46 之间。函数原型为

```
int isHex(char data);
```

问题 3 条件判断

写一个 C 语言函数，返回一个数字的绝对值。输入为有符号数，但输出为无符号数。函数原型为

```
uint32_t Abs(int32_t data);
```

问题 4 计算

写一个 C 语言函数，计算下面的等式

$$y = 1000/x – (3*x+1)/4$$

设 x 和 y 均为 32 位数。当输入为 0 时返回 y = 0x7FFFFFF (2^{31}-1)，其他情况下可忽略溢出。函数原型为

```
int32_t Calculate(int32_t x);
```

问题 5 计算

假设 x1, x2, x3, x4 是每隔 1ms 时间间隔收集的测量数据。利用下面等式计算离散导数

$$d = x1+3*x2-3*x3-x4$$

如果 x1 的单位是 mV，那么 d 的单位应为 mV/ms（或 V/s）。假设输入为 16 位带符号数，范围为 0 到 3300。通过将输出限制在-1000 到+1000 V/s 之间来解决溢出问题。提示：用 32 位运算计算中间结果，检查溢出，然后再返回 16 位的结果。函数原型为

```
int16_t Derivative(int16_t x1, int16_t x2,
int16_t x3, int16_t x4);
```

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