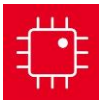




模块 3

活动：ARM Cortex M 架构



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问题 1

写一个汇编函数，检查一个 ASCII 字符，如果是字母的话返回值为真（R0=1），否则返回值为假（R0=0）。ASCII 编码中字母位于 0x41 至 0x5A，以及 0x61 至 0x7A 之间。输入的字符值传递给 R0，且返回值也使用 R0。

问题 2

写一个汇编函数计算三个数字的平均值。假设这三个数字的值作为函数的传入参数，分别用 R0、R1 和 R2 表示。返回值为 R0。

问题 3

写一个汇编函数从三个数字中找到最大的数。假设这三个数字的值作为函数的传入参数，分别用 R0、R1 和 R2 表示。返回值为 R0。

问题 4

写一个汇编函数计算下面的二次多项式

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

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 $y = 0x80000000 (-2^{31})$ 。输入参数 x 传入 R0，返回值也通过 R0 返回。

问题 5

写一个汇编函数，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。输入参数的值分别传入 $x1=R0$ ， $y1=R1$ ， $x2=R2$ 以及 $y2=R3$ 。返回值通过 R0 传出。

问题 6

写一个汇编函数，当 $10 \leq x < 99$ 时返回真（R0=1），否则返回假（R0=0）。输入参数 x 传入 R0，返回值通过 R0 传出。

问题 7

用子函数的形式重写问题 5 的程序。创建一个子函数，输入 n 由 R0 传入，并返回输入的平方 $R0=n^2$ 。之后用这个子函数求解两点间的距离。这里问题的关键是管理好 AAPCS 和 LR 寄存器。

问题 8

用浮点数运算重写问题 4。假设输入参数传入寄存器 S0，输出参数通过 S0 返回。

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