ABI

1. Write an ABI compliant assembly function that performs the following function:

$$f(x) = x^2 + x$$

- Assume the assembly function f(x) is called FUNCX.
- The squaring function is performed by a C function called:

square(x)

- The assembly function must call the C function square(x) to perform the square. Assume the C function is written and you simply have to call it.

```
FUNCX:

mfspr   r0,LR           # get LR
stwu  r1,-12(r1)        # allocate 3 word stack frame
stw   r0,16(r1)         # save LR in previous frame
stw   r3 ,8(r1)         # save volatile register r3, argument x

bl      square          # branch to square

lwz   r4,8(r1)          # load x to r4
add   r3,r3,r4          # X^2 + x

lwz     r0,16(r1)       # get LR from previous frame
mtspr   LR,r0           # restore LR
addi    r1,r1,12        # restore SP
blr                     # return to call point with argument
                        # in r3
```

2. Given the following assembly code:

```
        .data
        .align 2
        .skip 20
stack:  .skip 4

        .text

        .align 2
        .global _start

_start: lis     r1,stack@h
        ori     r1,r1,stack@l
        stwu    r1, -8(r1)
        r3 = 1
        bl do
        next line

        more code

do:     mflr    r0
        stwu    r1,-12(r1)
        stw     r0,16(r0)
        stw     r3, 8(r1)
        break point

        more code
```

Assume the code is run to break point. Assume the text section is located at 100 decimal and data section is located at 200 decimal. Express all values in decimal. If the value is unknown, write unknown.

Memory Location	**Memory Contents**
stack	unknown
Stack - 4	120
Stack - 8	200
Stack - 12	1
Stack - 16	unknown
Stack - 20	192