Homework 3
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1D.

Stack at Beginning *fp*
t0
t5
t6 *sp*

Stack at Beginning
t0
t5
t6
fp
ra
fp *sp*

Stack at Beginning
t0
t5
t6
fp
arg2 = a1
ra
fp
s0
s1
s2
s7 *sp*

2D.

```
addiu   $sp, $sp, -8          # create space to save 2 temps
sw      $t0, 4($sp)           # store t0
sw      $t1, 0($sp)           # store t1

addi    $a0, $zero, 'a'       # a0 = arg1 = 'a'
addi    $a1, $zero, 10        # a1 = arg2 = 10
addi    $a2, $zero, 'B'       # a2 = arg3 = 'B'
addi    $a3, $zero, -2        # a3 = arg4 = -2
addi    $t2, $zero, 0xffff    # t2 = 0xffff
sw      $t2, -4($sp)          # store arg5 at 4 bytes below sp

jal     qwerty

lw      $t0, 4($sp)           # restore t0
lw      $t1, 0($sp)           # restore t1
addiu   $sp, $sp, 8           # de-allocate extra space
```

3D.

```
# Prologue
        addiu       $sp, $sp, -28           # stack frame for 5 params
        sw          $fp, 0($sp)             # store fp
        sw          $ra, 4($sp)             # store ra
        sw          $a1, 12($sp)            # store a1
        addiu       $fp, $sp, 24            # update fp

        addiu       $sp, $sp, -4            # add space for one S register
        sw          $s1, 0($sp)             # store s1

# … Body …

        lw          $s1, 0($sp)             # restore s1
        addiu       $sp, $sp, 4             # de-allocate S space

# Epilogue
        lw          $ra, 4($sp)             # restore ra
        lw          $fp, 0($sp)             # restore fp
        addiu       $sp, $sp, 28            # de-allocate stack frame
        jr          $ra
```

4E.

3952 = 2048+1024+512+256+64+32+16
3952 = 2^11 + 2^10 + 2^9 + 2^8 + 2^6 + 2^5 + 2^4
3952 = 1111_0111_0000
So, 3952 = 1.1110111 * 2^11

Single Precision:
Bias = 127
Exponent = 11 + 127 = 138 = 1000_1010

0	10001010	11110111000000000000000
Sign	Exponent (8 bits)	Fraction (23 bits)

Double Precision:
Bias = 1023
Exponent = 11 + 1023 = 100_0000_1010

0	10000001010	11110111000000000000000000000000…..
Sign	Exponent (11 bits)	Fraction (52 bits)