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

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

Homework 3

Alexander Miller

**1D.**

|  |
| --- |
| 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)