Write cgen for the expression e1+e2

cgen(e1+e2) =

cgen(e1)

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

cgen(e2)

lw \$t1 4(\$sp)

add \$a0 \$t1 \$a0

addiu \$sp \$sp 4

Page 2

write code that cgen generates for the expression 5+7

li \$a0 5

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

li \$a0 7

lw \$t1 4(\$sp)

add \$a0 \$t1 \$a0

addiu \$sp \$sp 4

cgen for d1+d2, where d1 = 7 and d2 = 8

cgen(7+8)=

li \$a0 7

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

li \$a0 8

lw \$t1 4(\$sp)

add \$a0 \$t1 \$a0

addiu \$sp \$sp 4

Page 3

cgen for if d1=d2 then d1+d2 else d1-d2, where d1=7 and d2=8

ccgen(if 7=8 then 7+8 else 7-8)

li \$a0 7 0(\$sp) SW \$a0 addiu \$sp \$sp -4 li \$a0 8 4(\$sp) lw \$t1 addiu \$sp \$sp 4

\$a0 \$t1 true_b

false_b:

beq

li \$a0 7 0\$(sp) \$a0 SW addiu \$sp \$sp -4 \$a0 li 8 \$t1 4(\$sp) lw sub \$a0 \$t1 \$a0 addiu \$sp \$sp 4 b end_if

true_b:

7 li \$a0 0\$(sp) \$a0 SW addiu \$sp \$sp -4 li \$a0 8 4(\$sp) \$t1 lw add \$a0 \$t1 \$a0 \$sp 4 addiu \$sp

end_if:

cgen for 3+1

li \$a0 3

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

li \$a0 1

lw \$t1 4(\$sp)

add \$a0 \$t1 \$a0

addiu \$sp \$sp 4

Page 4

cgen for if x=1 then x else f(1,0)

lw \$a0 4(\$fp)

sw \$a0 0(\$sp)

addiu \$sp \$sp-4

li \$a0 1

lw \$t1 0(\$sp)

addiu \$sp \$sp 4

beq \$t1 \$a0 true_b

false_b :

sw \$fp 0(\$sp)

addiu \$sp \$sp -4

li \$a0 0

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

li \$a0 1

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

jal f_entry

b end_if

true_b:

lw \$a0 4(\$fp)

end_if:

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cgen for (if e1=e2 then e3 else e4)

```
cgen(if e1=e2 then e3 else e4) =
cgen(e1)
           0($sp)
SW
      $a0
addiu $sp $sp -4
cgen(e2)
      $t1
           4($sp)
lw
addiu $sp
             $sp 4
      $a0 $t1 true_branch
beq
false_branch:
cgen(e4)
b end_if
true_branch:
cgen(e3)
end_if:
```

def f(x,y) = if x = y then x else 0

f_entry:

move \$fp \$sp \$ra 0(\$sp) SW addiu \$sp \$sp -4 \$a0 4(\$fp) lw \$a0 0(\$sp) SW addiu \$sp \$sp -4 \$a0 8(\$fp) lw \$t1 4(\$sp) lw addui \$sp \$sp 4 \$a0 \$t1 true_b beq

false_b :

li \$a0 0 b end_if

true_b :

lw \$a0 4(\$fp)

end_if:

 Iw
 \$ra
 4(\$sp)

 addiu
 \$sp
 \$sp 16

 Iw
 \$fp
 0(\$sp)

 jr
 \$ra

write code that cgen generates for the expression x+5

lw \$a0 4(\$fp)

sw \$a0 0(\$sp)

addiu \$sp \$sp -4

li \$a0 5

lw \$t1 4(\$sp)

add \$a0 \$t1 \$a0

addiu \$sp \$sp 4

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cgen for 5

li \$a0 5

def add(x,y)=x+y+z

add_entry:

move	\$fp	\$sp	
SW	\$ra	0(\$sp)	
addiu	\$sp	\$sp -4	
lw	\$a0	4(\$fp)	//load x
SW	\$a0	0(\$sp)	PUBLIF
addiu	\$sp	\$sp -4	7-100"
lw	\$a0	8(\$fp)	//load y
lw	\$t1	4(\$sp)	
add	\$a0	\$t1 \$a0	
addiu	\$sp	\$sp 4	
SW	\$a0	0(\$sp)	//store x+y
sw addiu	\$a0 \$sp	0(\$sp) \$sp -4	//store x+y
			//store x+y
addiu	\$sp	\$sp -4	//store x+y
addiu li	\$sp \$a0	\$sp -4 z	//store x+y // add (x+y)+z
addiu li lw	\$sp \$a0 \$t1	\$sp -4 z 4(\$sp)	
addiu li lw add	\$sp \$a0 \$t1 \$a0	\$sp -4 z 4(\$sp) \$t1 \$a0	
addiu li lw add addiu	\$sp \$a0 \$t1 \$a0 \$sp	\$sp -4 z 4(\$sp) \$t1 \$a0 \$sp 4	
addiu li lw add addiu lw	\$sp \$a0 \$t1 \$a0 \$sp \$ra	\$sp -4 z 4(\$sp) \$t1 \$a0 \$sp 4 4(\$sp)	

add(4,5)

SW	\$fp	0(\$sp)
addiu	\$sp	\$sp -4
li	\$a0	5
SW	\$a0	0(\$sp)
addiu	\$sp	\$sp -4
li	\$a0	4
sw	\$a0	0(\$sp)
addiu	\$sp	\$sp -4
jal	add_entry	