Assignment 0

Programming Assignment 0: Toy Cool Programs

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Correct Programs

Program 1 (divisible.cl)

Correspondence between MIPS and Program:

Source	MIPS	Meaning
(b/a)	div $t1 $t1 $t2	Division Operation in Main.main
a*(b/a)	mul $t1 $t1 $t2	Multiplication Operation in Main.main
if a*(b/a) = b	beq $t1 $t2 label2	Branching to label2 which contains other branches to label3 and label0

Program 2 (exponentiation.cl)

Correspondence between MIPS and Program:

Source	MIPS	Meaning
while j <b	blt $t1 $t2 label2 b label0	The two statements are present in different labels, going back and forth runs the loop
an <- an*a	mul $t1 $t1 $t2	
out_string("\n");	str_const0: .... .ascii "\n"	The string constant "\n" is str_const0 in the mips file

Program 3 (isPrime.cl)

Correspondence between MIPS and Program:

Source	MIPS	Meaning
j*(n/j) = n	beq $t1 $t2 label7	Branch if the equality test holds
j <= n/2	ble $t1 $t2 label2	Branch if less than
j*(n/j)	div $t1 $t1 $t2 mul $t1 $t1t2	Division followed by multiplication. (precedence)
out_string("NO\n");	str_const0: .... .ascii "NO\n"	Storage of the string constants
out_string("YES\n");	str_const0: .... .ascii "YES\n"	

Program 4 (perimeterRect.cl)

Correspondence between MIPS and Program:

Source	MIPS	Meaning
getArea	Main.getArea:	
2*(a + b)	mul $t1 $t1 $t2	The multiplication operation
out_int(getArea(8,5)); out_string("\n");	str_const0: ... .ascii "\n" IO_dispTab: ... .word IO.out_string .word IO.out_int	Storage and printing of int and newline

Program 5 (rightAngleTriangle.cl)

Correspondence between MIPS and Program:

Source	MIPS	Meaning
a*a, b*b, c*c	Main.check mul $t1 $t1 $t2 ... mul $t1 $t1 $t2 ... mul $t1 $t1 $t2	Multiplying operation takes place three times in Main.check
if a*a + b*b = c*c	beq $t1 $t2 label2	Branching when the pythogaros theorem holds
if check(3, 4, 5) then out_string("YES\n") else out_string("NO\n") fi	bne $a0 $zero label11 beqz $t1 label9	Branching to the appropriate label to print the correct answer

Incorrect Programs

Section 10.1

Error Message:
"add.cl", line 2: syntax error at or near INT_CONST = 5
"add.cl", line 5: syntax error at or near ';'
"add.cl", line 7: syntax error at or near '}'

It is clearly mentioned that integer are non-empty strings of digits 0-9, but this program tries to put in a space in between therefore we get the error at 5.

Line From text:
"Integers are non-empty strings of digits 0-9"

Section 10.2

Error Message:
"lengthstring.cl", line 3: syntax error at or near ERROR = Unterminated string constant

In the manual it is mentioned that non escaped newline character may not appear in a string hence we get the error which assumes we did not terminate the string constant.

Lines from text:
"A non-escaped newline character may not appear in a string"

Section 10.3

Error Message:
"comms.cl", line 7: syntax error at or near '}'
Introducing – together can turn the rets of the line into a comment, which is precisely what happened here.

Lines from text:
"Any characters between two dashes – and the next newline (or EOF, if there is no next newline) are treated as comments."

Section 10.4

Error Message:
"equalitycheck.cl", line 3: syntax error at or near NEW
"equalitycheck.cl", line 5: syntax error at or near THEN
new is a reserved keyword and cannot be used as an identifier.

Lines from text: *"The keywords of cool are: class, else, false, fi, if, in, inherits, isvoid, let, loop, pool, then, while, case, esac, new, of, not, true."*

Section 10.5

Error Message:
"nospace.cl", line 7: syntax error at or near OBJECTID = out_string
White space includes a combination of the blanks, tabs, etc, leaving whitespace empty i.e. no space does not belong to whitespace therefore we ger the error.

Lines from text:
"White space consists of any sequence of the characters: blank (ascii 32), \n (newline, ascii

10), \f (form feed, ascii 12), \r (carriage return, ascii 13), \t (tab, ascii 9), \v (vertical tab, ascii 11).”