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# Samuel Wait, CS 2318-254, Assignment 2 Part 1 Program C

#####

#Allocate a global array (i.e., space in the data segment) enough for

#storing 3 integers and initialize the array (from 1st to 3rd element)

# with 3033, 2022 and 1011 at the same time

#Display a labeled output about the array's initial contents

#Re-order the values in the array so that the contents of the array in memory

#Display a labeled output about the array's contents

##### data segment #####

intArray:

intArrayContents:

intArray0:

intArray1:

intArray2:

swapped1and2:

swapped1and3:

swapped2and3:

##### code segment #####

main:

.data

.word 3033, 2022, 1011 #global int array of integers

#initialized to 3033,2022,1011

.ascii "Original Contents of intArray: "

.ascii "intArray[0]: "

.ascii "intArray[1]: "

.ascii "intArray[2]: "

.ascii "Swapped intArray[0] and intArray[1]."

.ascii "Swapped intArray[0] and intArray[2]"

.ascii "Swapped intArray[1] and intArray[2]"

.text

.globl main

#loading the contents of intArray into temporary registers

la \$t0, intArray # \$t0 has address of intArray

lw \$t1, 0(\$t0) # \$t1 has intArray[0] (3033)

lw \$t2, 4(\$t0) # \$t2 has intArray[1] (2022)

lw \$t3, 8(\$t0) # \$t3 has intArray[2] (1011)

#Printing the contents of intArray

li \$v0, 4

la \$a0, intArrayContents

syscall

li \$v0, 11

li \$a0, '\n'

syscall

li \$v0, 4

la \$a0, intArray2

syscall

li \$v0, 1

move \$a0, \$t3 #should print intArray[2] (1011)

syscall

li \$v0, 11

li \$a0, '\n'

syscall

li \$v0, 4

la \$a0, intArray1

syscall

li \$v0, 1

move \$a0, \$t2 #should print intArray[1] (2022)

syscall

li \$v0, 11

li \$a0, '\n'

syscall

li \$v0, 4

la \$a0, intArray0

syscall

li \$v0, 1

move \$a0, \$t1 #should print intArray[0] (3033)

syscall

li \$v0, 11

li \$a0, '\n'

syscall

#Swapping intArray[0] and intArray[1] in memory

lw \$t1, 0(\$t0) #reloads intArray[0] (3033) into \$t1 from memory

lw \$t2, 4(\$t0) #reloads intArray[1] (2022) into \$t2 from memory

sw \$t2, 0(\$t0) #stores int in \$t2 (2022) to intarray[0]

sw \$t1, 4(\$t0) #stores int in \$t1 (3033) to intarray[1]

#intArray should now = 2022,3033,1011

#Printing the contents of intArray

```
lw $t1, 0($t0) # $t1 has intArray[0] (2022)
lw $t2, 4($t0) # $t2 has intArray[1] (3033)
lw $t3, 8($t0) # $t3 has intArray[2] (1011)
```

```
li $v0, 11
li $a0, '\n'
syscall
li $v0, 4
la $a0, swapped1and2
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```
li $v0, 4
la $a0, intArray2
syscall
li $v0, 1
move $a0, $t3 # should print intArray[2] (1011)
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```
li $v0, 4
la $a0, intArray1
syscall
li $v0, 1
move $a0, $t2 # should print intArray[1] (3033)
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```
li $v0, 4
la $a0, intArray0
syscall
li $v0, 1
move $a0, $t1 # should print intArray[0] (2022)
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```
# Swapping intArray[0] and intArray[2]
lw $t3, 8($t0) # reloads intArray[2] (1011) into $t3 from memory
lw $t2, 0($t0) # reloads intArray[0] (2022) into $t2 from memory
sw $t3, 0($t0) # stores int in $t3 (1011) to intArray[0]
sw $t2, 8($t0) # stores int in $t2 (2022) to intArray[2]
# intArray should now = 1011, 3033, 2022
```

```
# Printing the contents of intArray
lw $t1, 0($t0) # $t1 has intArray[0] (1011)
lw $t2, 4($t0) # $t2 has intArray[1] (3033)
lw $t3, 8($t0) # $t3 has intArray[2] (2022)
```

```
li $v0, 11
li $a0, '\n'
syscall
li $v0, 4
la $a0, swapped1and3
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```
li $v0, 4
la $a0, intArray2
syscall
li $v0, 1
move $a0, $t3 # should print intArray[2] (2022)
syscall
li $v0, 11
li $a0, '\n'
syscall
```

```

li $v0, 4
la $a0, intArray1
syscall
li $v0, 1
move $a0, $t2 #should print intArray[1] (3033)
syscall
li $v0, 11
li $a0, '\n'
syscall

li $v0, 4
la $a0, intArray0
syscall
li $v0, 1
move $a0, $t1 #should print intArray[0] (1011)
syscall
li $v0, 11
li $a0, '\n'
syscall

#Swapping intArray[1] and intArray[2]
lw $t2, 8($t0) #reloads intArray[2] (2022) into $t2 from memory
lw $t1, 4($t0) #reloads intArray[1] (3033) into $t1 from memory
sw $t2, 4($t0) #stores int in $t2 (2022) to intarray[1]
sw $t1, 8($t0) #stores int in $t1 (3033) to intarray[2]
#intArray should now = 1011,2022,3033

#Printing the contents of intArray
lw $t1, 0($t0) #$t1 has intArray[0] (1011)
lw $t2, 4($t0) #$t2 has intArray[1] (2022)
lw $t3, 8($t0) #$t3 has intArray[2] (3033)

li $v0, 11
li $a0, '\n'
syscall
li $v0, 4
la $a0, swapped1and2
syscall
li $v0, 11
li $a0, '\n'
syscall

li $v0, 4
la $a0, intArray2
syscall
li $v0, 1
move $a0, $t3 #should print intArray[2] (1011)
syscall
li $v0, 11
li $a0, '\n'
syscall

li $v0, 4
la $a0, intArray1
syscall
li $v0, 1
move $a0, $t2 #should print intArray[1] (3033)
syscall
li $v0, 11
li $a0, '\n'
syscall

li $v0, 4
la $a0, intArray0
syscall
li $v0, 1
move $a0, $t1 #should print intArray[0] (2022)
syscall
li $v0, 11
li $a0, '\n'
syscall

#Graceful exit
li $v0, 10
syscall

```