微算機系統第一次隨堂考 姓名_____ 學號_____

(Example on page 98) (a) (70%)The while loop, `while(save[i]==k)i+=1;`, was compiled into MIPS assembler code

```
Loop:  sll $t1,$s3,2        # Temp reg $t1=4*i
       add $t1,$t1,$s6      # $t1=address of save[i]
       lw $t0,0($t1)        # Temp reg $t0=save[i]
       bne $t0,$s5,Exit     # go to Exit if save[i]≠k
       addi $s3,$s3,1       #  i=i+1
       j Loop               # go to Loop
Exit:
```

If we assume we place the loop starting at location 00013880H (i.e., $1\times16^4+3\times16^3+8\times16^2+8\times16+0 = 80000_{ten}$), please complete the machine code (i.e., calculate x and y) for this loop below.

	6-bit op	5-bit	5-bit	5-bit	5-bit	6-bit
00013880H	0_{ten}	0_{ten}	19_{ten}	9_{ten}	4_{ten}	0_{ten}
00013884H	0_{ten}	9_{ten}	22_{ten}	9_{ten}	0_{ten}	32_{ten}
00013888H	35_{ten}	9_{ten}	8_{ten}	0		
0001388BH	5_{ten}	8_{ten}	21_{ten}	x_{ten}		
00013890H	8_{ten}	19_{ten}	19_{ten}	1_{ten}		
00013894H	2_{ten}	y_{ten}				
00013898H	…					

(b) (30%) If the loop starts at location 10013880H, will x and y change? Justify your answer.

答: (a) x = 2 and y = 20000. (b) The answer is "x and y remain unchanged". You can confirm the answer simply by following the same procedure described in page 98 of textbook.