Started on	Wednesday, 3 November 2021, 10:09 AM
State	Finished
Completed on	Wednesday, 3 November 2021, 11:09 AM
Time taken	1 hour

Question **1**

Complete

Marked out of 5.00

What is the content of $s1 after the execution of this line:

Assuming $s2 contains, 0xa0a0a0a0:
sll $s1,$s2,10 0xA0A0A0A0

Assuming $s2 contains, 0xa0a0a0a0:
srl $s1,$s2,10 0x00282828

Assuming $s2 contains, 0x0a0a0a0a:
srl $s1,$s2,10 0x00282828

Assuming $s2 contains, 0x0a0a0a0a:
sll $s1,$s2,10 0xA0A0A0A0

Assuming $s2 contains, 0xa0a0a0a0:
srl $s1,$s2,1 0x00028282

Question **2**

Complete

Marked out of 2.00

Assume initially, $t0 = 0x00101000, and $s0 = 0x10010000

What is the value of $t2 after the following instructions?

```
        slt $t2, $s0, $t0
        bne $t2, $s0, ELSE
j       DONE
ELSE: addi $t2, $t2, 2
DONE:
```

Answer: 3

Question **3**

Complete

Marked out of 2.00

Computer A has a clock rate of 4GHz. What is the clock cycle time for Computer A?

Answer: 40 x 10^9

Question **4**

Complete

Marked out of 2.00

Computer A has a clock rate of 400MHz. If it requires 400 clock cycles to complete an encryption program, how long does it take in seconds to complete the program?

Answer: 25 nanoseconds

Information

The following program encrypts a number (in the range of 0-2147483647) given by a user using a key (in the range of 0-9) also given by the user. It will then display the result of the encryption to the user.

Question **5**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal    PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal    PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal    PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal    PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (c) in line 30?

Answer: its a variable

Question **6**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (i) in line 56?

Answer: its contains a value by the user input

Question **7**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j  checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (b) in line 24?

Answer: label

Question **8**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (j) in line 61?

Answer: label

Question **9**

Complete

Marked out of 1.00

```
1                       .data
2   welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
3   getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
4   getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
5   contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
6   wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
7   resultmsg:          .asciiz "¥nThe encryption result is "
8
9                       .text
10  #1.   Print out a message string with a welcome message
11  #syscall print string
12
13    la $a0,(a)
14    jal    PrintString
15
16  #2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
17  prog:
18    la $a0,getinputnumber
19    jal    PrintString
20
21  #3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
22  #syscall read integer
23  togetinput1:
24    li  $v0,(b)
25    syscall
26    addi $s1,$v0,0 #s1 contains input1
27    #input1 validation (number must be between 0-2147483647
28    lui    $s2,0x7fff
29    ori    $s2,$s2,0xffff
30    blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
31    #wrong input >2147483647
32    la $a0,(d)
33    jal    PrintString
34    j   togetinput1
35    #correct input <2147483647, to check if input > 0
36  correctinput1lvl1:
37    bgez $s1,correctinput1lvl2#(input is >=0)
38    #wrong input <0
39    la $a0,(e)
40    jal    PrintString
41    j   (f)
42
43  correctinput1lvl2:
44  #4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
45    la $a0,(g)
46    jal    PrintString
47
48  #5. Get an input from user to enter a number from 0-9
49  #syscall read integer
50  togetinput2:
51    li  $v0,5
52    syscall
53    addi $s2,(h),0 #s2 contains input2#Q8
54
55    #input2 validation (input is between 0-9)
56    blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
57    la $a0,getkey
58    jal    PrintString
59    j   togetinput2
60  correctinput2lvl1:
61    bgez $s2,(j)#(input is >=0)#Q10
62    la $a0,getkey
63    jal    PrintString
64    j   togetinput2
65  correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (l) in line 75?

Answer: label

Question **10**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (g) in line 45?

Answer: label for the line

Question **11**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (e) in line 39?

Answer: label

Question **12**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal   PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal   PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal   PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal   PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (f) in line 41?

Answer: label for the jump and link

Question **13**

Complete

Marked out of 1.00

```
                    .data
welcomemsg:         .asciiz " ¥nThis program will encrypt a number with a given user-input key "
getinputnumber:     .asciiz "¥nPlease enter a number between 0-2147483647 to be encrypted "
getkey:             .asciiz "¥nPlease enter the encryption key between 0-9 "
contmsg:            .asciiz "¥nDo you want to continue? (Y/N) "
wrongmsg:           .asciiz "¥nPlease enter the correct number between 0-2147483647 "
resultmsg:          .asciiz "¥nThe encryption result is "

                    .text
#1.   Print out a message string with a welcome message
#syscall print string

   la $a0,(a)
   jal    PrintString

#2.   Print out a message string with the message "Please enter a number between 0-2147483647 to be encrypted "
prog:
   la $a0,getinputnumber
   jal    PrintString

#3. Get an input from user to enter a number from 0-2147483647 (1 word =max value is 0x7fffffff)
#syscall read integer
togetinput1:
   li  $v0,(b)
   syscall
   addi $s1,$v0,0 #s1 contains input1
   #input1 validation (number must be between 0-2147483647
   lui    $s2,0x7fff
   ori    $s2,$s2,0xffff
   blt    $s1,(c),correctinput1lvl1#(input is <2147483647) #Q3
   #wrong input >2147483647
   la $a0,(d)
   jal    PrintString
   j   togetinput1
   #correct input <2147483647, to check if input > 0
correctinput1lvl1:
  bgez $s1,correctinput1lvl2#(input is >=0)
  #wrong input <0
   la $a0,(e)
   jal    PrintString
   j   (f)

correctinput1lvl2:
#4.   Print out a message string with the message "Please enter the encryption key between 0-9 "
   la $a0,(g)
   jal    PrintString

#5. Get an input from user to enter a number from 0-9
#syscall read integer
togetinput2:
   li  $v0,5
   syscall
   addi $s2,(h),0 #s2 contains input2#Q8

   #input2 validation (input is between 0-9)
   blt    $s2,(i),correctinput2lvl1 #(input is <10)#Q9
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl1:
   bgez $s2,(j)#(input is >=0)#Q10
   la $a0,getkey
   jal    PrintString
   j   togetinput2
correctinput2lvl2:
```

```
66
67 #6. Do the process of encryption and get the result.
68    sllv  (k),$s1,$s2 #result is in $t1#Q11
69
70 #7.  Print out a message string with the input numbers and result
71    la $a0,resultmsg
72    jal    PrintString
73
74 #print result ($t1)
75    addi (l),$t1,0#Q12
76    jal    PrintInt
77
78 #8.  Print out another message string to ask whether the user wants to continue "Do you want to continue? (Y/N)"
79 checkcontinue:
80    la $a0,contmsg
81    jal    PrintString
82
83 #9.  If the user selects Y or y, the program loops to step 2. Otherwise, go to the next line.
84 #syscall getchar
85    li  $v0,12
86    syscall
87
88 #compare
89    addi $t2,$v0,0
90    beq  $t2,'Y',prog #if user enters Y, then go to prog
91    beq  $t2,'y',prog #if user enters y, then go to prog
92    beq  $t2,'N',endprog #if user enters N, then go to endprog
93    beq  $t2,'n',endprog #if user enters n, then go to endprog
94    la $a0,getkey
95    jal    PrintString
96    j   checkcontinue
97 #10. End the code
98 #syscall exit code
99 endprog:
100   li  $v0,10
101   syscall

103 PrintString:
104   li  $v0,4
105   syscall
106   jr  $ra
107
108 #procedure print integer
109 PrintInt:
110   li  $v0,1
111   syscall
112   jr  $ra
```

What is (a) in line 13?

Answer: label for the line