

Quiz 01 - 03/07/24

Thank you. Your instructor has reviewed your responses. Here are your results.

Score Summary			
(Click on question number to jump to question.)		points earned	points possible
Question 1	correct	1	1
Question 2	correct	1	1
Question 3	correct	1	1
Question 4	correct	1	1
Question 5	correct	1	1
Question 6	correct	1	1
	correct	1	1
Question 8	correct	1	1
Question 9	correct	1	1
Question 10	correct	1	1
Question 11	correct	1	1
Question 12	correct	1	1
Question 13	correct	1	1
Question 14	correct	1	1
Question 15	correct	1	1
Question 16	correct	1	1
Question 17	correct	1	1
Question 18	correct	1	1
Question 19	correct	1	1
Question 20	correct	1	1
Score: (100%)		20	20

1. Given this ML list:

```
val e = [[0, 1, 2], [3, 4, 5], [6, 7, 8]]
```

What is the value of

```
[5] :: (tl e)
```

The following answers are acceptable:

- `[[5], [3, 4, 5], [6, 7, 8]]`
- `[[5],[3,4,5],[6,7,8]]`

Your response:

```
[[5],[3,4,5],[6,7,8]]
```

Points earned: 1 out of 1

2. What value is bound to `ans` after the following ML code is evaluated?

```
fun mystery(x:int option, y:bool option) =  
  if isSome y andalso valOf y  
  then if isSome x  
        then let val z = (valOf x) in z * z end  
        else 0  
  else if isSome x  
        then ~(valOf x)  
        else ~1
```

```
val ans = mystery(SOME ~4, SOME true)
```

The following answer is acceptable:

16

Your response:

16

Points earned: 1 out of 1

3. Why does the decision of whether to use an ML list or tuple matter?

Your response:

This is a very important decision because a list contains a "array" of values indexed apporiporately whereas a tuple is just a fixed number of values bounded together. The operations you can do on the data structures are different and what useage comes down to it. For example if you want to represent multiple people objects in a classroom it would be best to use a list because you can modify and navigate and add to the list as needed for your needs. However, if you want to represent a RGB value of a particular red it would be best to use a tuple because it is always going to follow the format: (RED, GREEN, BLUE) ex. (200, 50, 5). It depends what your needs are and how you will be altering and modifying the objects.

Sample answer:

Internally, lists and tuples may be implemented differently so the choice of list or tuple could have performance or storage implications. Using a tuple prevents changes, since there is no way to add things to a tuple later. Using a list allows changes, through functions like `append`, `hd` and `tl`. Your choice also communicates information to other people reading your code. A tuple informs the reader that the data will not change, whereas a list cues the reader to expect changes.

Answers may vary.

Points earned: 1 out of 1

Instructor's comments:

4. What value is bound to ans after the following ML code is evaluated?

```
fun mystery(x:int option, y:bool option) =  
  if isSome y andalso valOf y  
  then if isSome x  
        then let val z = (valOf x) in z * z end  
        else 0  
  else if isSome x  
        then ~(valOf x)  
        else ~1
```

```
val ans = mystery(NONE, SOME false)
```

The following answer is acceptable:

~1

Your response:

~1

Points earned: 1 out of 1

5. Given the following ML list binding, match each expression with the correct value:

```
val e = [[0, 1, 2], [3, 4, 5], [6, 7, 8]]
```

	Correct answers	Your responses	
hd e	[0, 1, 2]	[0, 1, 2]	(correct)
hd (hd (tl (tl e)))	6	6	(correct)
[5] :: (tl e)	[[5], [3, 4, 5], [6, 7, 8]]	[[5], [3, 4, 5], [6, 7, 8]]	(correct)
hd (tl e)	[3, 4, 5]	[3, 4, 5]	(correct)
tl e	[[3, 4, 5], [6, 7, 8]]	[[3, 4, 5], [6, 7, 8]]	(correct)

Points earned: 1 out of 1

6. What is the value of ans after the following ML code is executed?

```
fun silly1 (z : int) =
```

```
let val x = if z > 0 then z else 34
val y = x+z+3
in
if x > y then x*2 else y*y
end
```

```
val ans = silly1(2)
```

The following answer is acceptable:

49

Your response:

49

Points earned: 1 out of 1

7. What is the value of ans after the following ML code is executed?

```
fun silly2 () =
  let val x = 1
  in
    (let val x = 2 in x+1 end) + (let val y = x+2 in y+1 end)
  end
```

```
val ans = silly2()
```

The following answer is acceptable:

7

Your response:

7

Points earned: 1 out of 1

8. Given this ML list:

```
val e = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

What is the value of

```
5 :: (tl e)
```

The following answers are acceptable:

- [5, 1, 2, 3, 4, 5, 6, 7, 8, 9]
- [5,1,2,3,4,5,6,7,8,9]

Your response:

[5, 1, 2, 3, 4, 5, 6, 7, 8, 9]

Points earned: 1 out of 1

9. Given the ML code below, place the values of each variable in each recursive iteration of the function in the correct order.

```
fun sum_list (xs:int list) =  
  if null xs  
  then 0  
  else hd(xs) + sum_list(tl xs)  
  
val ans = sum_list([1, 2, 3, 4, 5])
```

Correct answer	Your response (correct)
xs = [1, 2, 3, 4, 5] hd(xs) = 1 return = not bound yet	xs = [1, 2, 3, 4, 5] hd(xs) = 1 return = not bound yet
xs = [2, 3, 4, 5] hd(xs) = 2 return = not bound yet	xs = [2, 3, 4, 5] hd(xs) = 2 return = not bound yet
xs = [3, 4, 5] hd(xs) = 3 return = not bound yet	xs = [3, 4, 5] hd(xs) = 3 return = not bound yet
xs = [4, 5] hd(xs) = 4 return = not bound yet	xs = [4, 5] hd(xs) = 4 return = not bound yet
xs = [5] hd(xs) = 5 return = not bound yet	xs = [5] hd(xs) = 5 return = not bound yet
xs = [] hd(xs) = undefined return = 0	xs = [] hd(xs) = undefined return = 0
xs = [5] hd(xs) = 5 return = 5 + 0 = 5	xs = [5] hd(xs) = 5 return = 5 + 0 = 5
xs = [4, 5] hd(xs) = 4 return = 4 + 5 = 9	xs = [4, 5] hd(xs) = 4 return = 4 + 5 = 9
xs = [3, 4, 5] hd(xs) = 3 return = 3 + 9 = 12	xs = [3, 4, 5] hd(xs) = 3 return = 3 + 9 = 12
xs = [2, 3, 4, 5] hd(xs) = 2 return = 2 + 12 = 14	xs = [2, 3, 4, 5] hd(xs) = 2 return = 2 + 12 = 14
xs = [1, 2, 3, 4, 5] hd(xs) = 1 return = 1 + 14 = 15	xs = [1, 2, 3, 4, 5] hd(xs) = 1 return = 1 + 14 = 15

Points earned: 1 out of 1

10. Given this ML tuple binding:

```
val e = (7, (true, 9), 5, (false, 8), (3, 4))
```

match each expression with its corresponding value

	Correct answers	Your responses	
((#2 e), (#1 e))	((true, 9), 7)	((true, 9), 7)	(correct)
#2 e	(true, 9)	(true, 9)	(correct)
#1 (#5 e)	3	3	(correct)
#2 (#4 e)	8	8	(correct)
#1 e	7	7	(correct)

Points earned: 1 out of 1

11. Which tuples have the type

`int * int`

- (5, false)
- (3, 4) (correct answer, your response)
- (7, true)
- ((7, false), 8)
- (9, 5) (correct answer, your response)
- (8, 3, 4)
- (7, (true, 9))
- ((7, true), 9, 5)
- ((5, false), 8)
- (true, 5)

Points earned: 1 out of 1

12. What does silly3 evaluate to when called?

```
fun silly3() =  
  let  
    val x = (let val x = 4 in x + 8 end);  
  in  
    (x, let val x = 7 in x end, let val x = 2 in let val x = 4 in x end end)  
  end
```

- (12, 7, 4) (correct answer, your response)
- (4, 4, 4)
- (12, 7, 2)
- (5, 7, 2)

Feedback: Correct.

Points earned: 1 out of 1

13. Given this ML tuple:

```
val e = (7, (true, 9, 5), (false, 8), 3, 4)
```

What is the value of

#1 e

The following answer is acceptable:

7

Your response:

7

Points earned: 1 out of 1

14. What value is bound to ans after the following ML code is evaluated?

```
fun mystery(x:int option) =  
  if isSome x  
  then let val y = (valOf x) in y * y end  
  else 0
```

```
val ans = mystery(NONE)
```

The following answer is acceptable:

0

Your response:

0

Points earned: 1 out of 1

15. Given this ML list:

```
val e = [[0, 1, 2], [3, 4, 5], [6, 7, 8]]
```

What is the value of

```
hd (tl e)
```

The following answers are acceptable:

- [3, 4, 5]
- [3,4,5]

Your response:

[3,4,5]

Points earned: 1 out of 1

16. Given this ML tuple:

```
val e = (7, true, (9, 5), false, (8, 3), 4)
```

What is the value of

#1 e

The following answer is acceptable:

7

Your response:

7

Points earned: 1 out of 1

17. Which tuples have the type

```
(int * bool) * int
```

- (5, false)
- (3, 4)
- (7, true)
- ((7, false), 8) (correct answer, your response)
- (9, 5)
- (8, 3, 4)
- (7, (true, 9))
- ((7, true), 9, 5)
- ((5, false), 8) (correct answer, your response)
- (true, 5)

Points earned: 1 out of 1

18. What does silly3 evaluate to when called?

```
fun silly3() =  
  let  
    val x = (let val x = 5 in x + 10 end);  
  in  
    (x, let val x = 2 in x end, let val x = 10 in let val x = 2 in x end end)  
  end
```

- (15, 2, 2) (correct answer, your response)
- (5, 5, 5)
- (15, 2, 10)
- (5, 2, 10)

Feedback: Correct

Points earned: 1 out of 1

19. What value is bound to ans after the following ML code is evaluated?

```
fun mystery(x:int option, y:bool option) =  
  if isSome y andalso valOf y  
  then if isSome x  
    then let val z = (valOf x) in z * z end  
    else 0  
  else if isSome x  
    then ~(valOf x)  
    else ~1
```

```
val ans = mystery(SOME 3, SOME true)
```

The following answer is acceptable:

9

Your response:

9

Points earned: 1 out of 1

20. Given this ML list:

```
val e = [[0, 1, 2], [3, 4, 5], [6, 7, 8]]
```

What is the value of

```
hd (hd (tl (tl e)))
```

The following answer is acceptable:

6

Your response:

6

Points earned: 1 out of 1