Computer Science and Engineering

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Principles of

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Started on Wednesday, 2 February 2022, 8:50 AM

State Finished

Completed on Wednesday, 2 February 2022, 9:40 AM

Time taken 50 mins 37 secs

Grade 13.00 out of 15.00 (**87**%)

Question 1

Correct

Mark 1.00 out of 1.00

Flag question

Check the following Lambda Expression.

$$H = \lambda f. \lambda n. \text{ if } (= n \ 0) \ 1 \ (* n \ (f \ (- n \ 1)))$$

What does the expression represent?

Select one:

- Predecessor function
- Fibonacci function
- Y Combinator for a recursive function
- Ω

Your answer is correct.

The correct answer is: Y Combinator for a recursive function

Question 2

Incorrect

Mark 0.00 out of 2.00

Flag question

Consider the following functions.

Identify the correct input-output combination/s for the functions above.

Select one or more:

- Input: func2' (4, 5, 8, 1); Output: (8, 1) ✓
- **Input:** func1' (2, 3, 5); **Output:** 5
- Input: func2' (1, 2, 4); Output: 4 *
- Input: func1' (a, b, c); Output: (b, c) *

Your answer is incorrect.

The correct answer is: Input: func1' (2, 3, 5); Output: 5, Input: func2' (4, 5, 8, 1); Output: (8, 1)

Question 3

Correct

Mark 1.00 out of 1.00

Flag question

Evaluate the following lambda Expression.

$$(\lambda x. \lambda y. + x ((\lambda x. (-x 3)) y)) 5 6$$

Select one:

- **15**
- **14**
- _ 2
- 8

Your answer is correct.

The correct answer is: 8

Question 4

Correct

Mark 2.00 out of 2.00

Flag question

Consider the following function definitions.

Identify the correct statement/s

Select one or more:

- fun1 finds prime number
- fun1 evaluates frequency of numbers
- fun2 evaluates lcm of numbers

Your answer is correct.

The correct answer is: fun2 evaluates gcd of numbers

Question **5**

Correct

Mark 1.00 out of 1.00

Flag question

Consider the following lambda expressions

I.
$$\lambda t. (\lambda x. t (x x)) (\lambda x. t (x x))$$

II.
$$\lambda m. \lambda n. \lambda x. (m (n x))$$

III.
$$\lambda g$$
. λf . λx . g (f x)

IV.
$$\lambda n. \lambda f. \lambda x. (f((n f) x))$$

and their descriptions

- Multiplication
- 2. Successor
- Y Combinator
- 4. Constant
- 5. Composition

Match each lambda expression above with respective proper description.

Select one:

Your answer is correct.

The correct answer is: I-3, II-1, III-5, IV-2, V-4

Question 6

Consider the following functions.

Correct

Mark 2.00 out of 2.00

Flag question

```
( defun fun2 ( list i)
  ( cond
      (( not ( integerp i)) ( error "Non integer index " i))
      (( not ( plusp i)) ( error "Non strictly positive index " i))
      (t (elt list (1- i )))))
```

```
( defun fun3 ( list i)
  (let (( result nil ))
    ( loop while list
      do ( loop repeat (1- i)
           while list
           do ( push (pop list ) result ))
      (pop list ))
      ( nreverse result )))
```

Identify the correct statement regarding the functions.

Select one:

func2' and func3' perform the same task

func1' and func2' perform the same task func1' and func3' perform the same task All are performing the same task Your answer is correct. The correct answer is: func1' and func2' perform the same task Identify the correct parenthesization of the following lambda expression. λa b c. E Select one: (λa. (λb c. E)) (λa. ((λb λc). E))((λa. b. c.) E)

Question 7

Correct

1.00

Mark 1.00 out of

Flag question

```
(λa. (λb. (λc. E)))

✓
```

```
Your answer is correct.
```

The correct answer is:

```
(λa. (λb. (λc. E)))
```

Ouestion 8

Correct

Mark 2.00 out of 2.00

Flag question

Consider the following functions.

```
( defun foo ( sequence &key (key ( function identity )))
  (let (( table (make -hash - table )))
      (map nil ( lambda ( item ) ( incf ( gethash ( funcall key item )
            table 0))) sequence )
      table ))
```

What will be the output of the function call **fun((u v w) (a b c) (f g))**?

Select one:

(a b c) (f g) (u v w)

(u v w) (a b c) (f g)

(f g) (u v w) (a b c) √

(f g) (a b c) (u v w)

Your answer is correct.

The correct answer is: (f g) (u v w) (a b c)

Question 9

Correct

Mark 1.00 out of 1.00

Flag question

Consider the following function.

Select one:

17

70

42

35

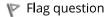
Your answer is correct.

The correct answer is: 70

Question 10

Correct

Mark 1.00 out of 1.00



State whether TRUE or FALSE.

Abstraction has higher precedence than Application in a lambda expression.

Select one:

- True
- False

The correct answer is 'False'.

Question 11

Correct

Mark 1.00 out of 1.00

Flag question

Consider the following function.

```
foo [] = []
foo ( x : xs ) = foo small ++ mid ++ foo large
  where
    small = [ y | y < - xs , y < x ]
    mid = [ y | y < - xs , y == x ] ++ [ x ]
    large = [ y | y < - xs , y > x ]
```

What will be the output for the input [3, 6, 4, 8, 1]?

Select one:

- 1, 3, 4, 6, 8
- 0 1, 8, 4, 6, 3
- 0 8, 6, 4, 3, 1
- 0 4, 6, 8, 3, 1

Your answer is correct.

The correct answer is: 1, 3, 4, 6, 8

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