Mid-Semester Exam (COMP1100)

STUDENT NAME

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Q1 Acknowledgment

0 Points

Australian National University

COMP1100 Mid-Semester Exam, Semester 1 2021

You must acknowledge the following **integrity pledge** before proceeding. Please read carefully and check all the boxes.

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Read and check off the following instructions:

1. This examination is timed.

   - [ ] Note the remaining time at the top right of this screen. Set an alarm for yourself if you need one.

2. Permitted materials. This is an open book exam. You might in particular find the course Website, the Prelude documentation, and the Data.List documentation useful.

   - [ ] You may use any documentation you wish but **all work must be your own**.

Save Answer

Q2 Types

2.5 Points

Consider the following Haskell function signature:

```
foo :: String -> Int -> String
```

Select which of the following is false:

- `foo "a" 1` can be given a type.
- `foo "a"` can be given a type.
- ~~`foo "a" 1 "a"` can be given a type.~~
- `foo ['a','b']` has type `Int -> String`.
- `foo "abc" 2` has type `String`.

Save Answer

Q3 Haskell Functions

2.5 Points

Consider the following Haskell type signature:

```
myFun :: Bool -> Bool -> Bool
```

Four of the following implementations of this function behave the same.

A.

```
myFun a b = case (a,b) of
  (True, True)  -> True
  (True, False) -> False
  (False, True) -> False
  (False, False) -> True
```

B.

```
myFun a b = a == b
```

C.

```
myFun a b
  | a == True && b == True = True
  | otherwise = False
```

D.

```
myFun a b = (a && b) || not (a || b)
```

E.

```
myFun False False = True
myFun a b = a && b
```

Select which one behaves *differently* than the others?

- A
- B
- ~~C~~
- D
- E

Save Answer

Q4 Type Signatures

2.5 Points

Consider the following Haskell function definition:

```
bar a b = abs a + a / b
```

Which of the following is a valid Haskell type signature for this function?

- `bar :: Integer -> Integer -> Double`
- `bar :: Int -> Double -> Double`
- ~~`bar :: Int -> Int -> Int`~~
- `bar :: Int -> Int -> Double`
- `bar :: Double -> Double -> Double`

Save Answer

Q5 Lists

2.5 Points

Which of the following statements is *false* in Haskell:

- A list of functions can be defined.
- ~~`[[], [], [[]], [1]]` is a valid list.~~
- Lists can be used in recursive functions.
- Infinite lists can be constructed.
- An empty list is often used as a base case in recursion.

Save Answer

Q6 Sets and Functions

5 Points

Select which of the following are True or False:

Q6.1 Sets

1 Point

$(\mathrm{False}, 1)$ is an element of the set $\mathbb{B} + \mathbb{Z}$.

- True
- ~~False~~

Save Answer

Q6.2 Functions

1 Point

Given $f :: A \to (B \to C)$, a an element of A, and b an element of B, then $(f(a))(b)$ is an element of C.

- ~~True~~
- False

Save Answer

Q6.3 Functions
1 Point

Mathematical functions are pure.

- ~~True~~
- False

Save Answer

Q6.4 Sets and Functions
1 Point

Given sets A and B, then $A \to B$ represents the set of all possible functions from A to B.

- ~~True~~
- False

Save Answer

Q6.5 Sets
1 Point

The set $\mathbb{B} \times \mathbb{B}$ has 8 elements.

- True
- ~~False~~

Save Answer

Q7 Haskell
2 Points

Select which of the following are True or False:

Q7.1 Type Safety

1 Point

Haskell is dynamically typed.

- True
- ~~False~~

Save Answer

Q7.2 Lists

1 Point

A list in Haskell can only have elements of the same type.

- True
- ~~False~~

Save Answer

Q8 Lists and Strings

3 Points

Consider the following Haskell function definition:

```
tail' xs = case xs of
  [] -> []
  _:ys -> ys
```

Select which of the following are True or False:

Q8.1 Strings

1 Point

A valid type signature for the expression `tail' "comp1100"` is `[Char]`.

- ~~True~~
- False

Save Answer

Q8.2 Lists

1 Point

`tail' []` gives the same result as `tail' [[]]`.

- True
- ~~False~~

Save Answer

Q8.3 Lists

1 Point

`tail' [True, False]` returns `False`.

- ~~True~~
- False

Save Answer

Q9 Programming

30 Points

The programming questions are distributed to you via gitlab.

- You can find the exam gitlab repository at **https://exam-gitlab.cecs.anu.edu.au**.
- Do not change the name of this repository, or we will not be able to mark your exam.
- You should clone **your** repository to your local machine to do your work.

- During the exam, tutors will be available on Piazza and Teams so that students can get help in case of technical problems.
- Once you have cloned the exam you should answer the programming questions in the given Haskell files.
- After you complete each question you should **commit and push** your work to gitlab. We recommend that you check if your push was successful at your repository on gitlab.

Save Answer

Save All Answers

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