

NATIONAL UNIVERSITY OF SINGAPORE
Department of Computer Science, School of Computing
IT5001 – *Software Development Fundamentals*
Academic Year 2024/2025, Semester 1

Mid-Term Assessment
QUESTION BOOKLET

9 October 2024

Time allowed: 1 hour

INSTRUCTIONS TO CANDIDATES (please read carefully):

1. This is a **closed-book assessment**. You are allowed **ONE (1)** A4-sized reference sheet, double-sided, printed or written, and **ONE (1)** blank A4 paper for scratch.
2. You may use a non-programmable, NUS-approved calculator.
3. Use of any other electronic devices, including smart watches, is **NOT** allowed.
4. The assessment consists of three (3) documents—the 'QUESTION BOOKLET' (this document), the 'ANSWER BOOKLET', and an 'OCR Answer Sheet'. Do **NOT** open these documents until you are told to do so.
5. This paper comprises **THIRTY (30) questions** and **TWELVE (12) pages** including this cover page.
6. Do **NOT** write your name on any document you submit.
7. Write your **Student Number (starting with A)** on the 'ANSWER BOOKLET'.
8. Write and shade your **Student Number (starting with A)** on the 'OCR Answer Sheet' using a 2B pencil.
9. For Multiple-Choice Questions (MCQs) Q1 to Q30 (inclusive), shade your answers on the 'OCR Answer Sheet' **using a 2B pencil**.
10. You are required to only submit the 'ANSWER BOOKLET' and the 'OCR Answer Sheet' at the end of the assessment. You may use the 'QUESTION BOOKLET' (this document) as scratch paper.
11. The total attainable score for this assessment is **100 marks**. You must complete all questions to score full marks. This assessment counts towards **20%** of your final grade.
12. You **cannot** communicate with anyone other than the invigilators throughout the exam.
13. You **must attempt the assessment on your own**. The University takes a zero-tolerance approach towards plagiarism and cheating.

MULTIPLE CHOICE QUESTIONS [100 marks]

1. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

10 // 8 + 6 * 4 - 2

- A. 23
- B. 23.0
- C. 23.25
- D. 24
- E. 0

2. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

False and (1/0) > 10

- A. True
- B. False
- C. 1
- D. 0
- E. Evaluating this expression yields an error

3. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

True != False and not True

- A. True
- B. False
- C. None
- D. 0
- E. Evaluating this expression yields an error

4. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

False and 'a' + 3 or 1 < 2

- A. True
- B. False
- C. 1
- D. 0
- E. Evaluating this expression yields an error

5. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

'qrstuvw'[3:4]

- A. 's'
- B. 'st'
- C. 't'
- D. 'tu'
- E. '' # Empty string

6. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

'abc'[3:5]

- A. '' # Empty string
- B. 'ab'
- C. 'bc'
- D. 'c'
- E. Evaluating this expression yields an error

7. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

'axolotl'[-4]

- A. '' # Empty string
- B. 'l'
- C. 'o'
- D. 't'
- E. Evaluating this expression yields an error

8. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

('x' * 4 + 'y' * 3) * 2

- A. '' # Empty string
- B. 'xxxxxxxxxxxx'
- C. 'xxxxxxxxxxxxxx'
- D. 'xxxxxyyyyyxxxxyy'
- E. Evaluating this expression yields an error

9. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

```
'mangosteen'[-5:-10] + ' juice'
```

- A. ' juice'
- B. 'mango juice'
- C. 'steen juice'
- D. 'neets juice'
- E. Evaluating this expression yields an error

10. What is the output of the following code? **[3 marks]**

```
x = 30
if x < 100:
    if x > 50:
        print('A')
    elif x > 10:
        print('B')
    else:
        print('C')
else:
    print('D')
```

- A. A
- B. B
- C. C
- D. D
- E. No output is produced

11. What is the output of the following code? **[3 marks]**

```
n, s = '0', 'me'
if n and s:
    n, s = s, n
elif not n:
    if not s:
        s = n + s
if s:
    s *= 2
print(s)
```

- A. me
- B. meme
- C. 00
- D. 0
- E. Executing this code yields an error

12. What is the output of the following code? [3 marks]

```
def foo(p):
    (x, y) = p
    if x > 0 and y > 0:
        return True
    elif x > 0 or y > 0:
        return x*y > 0
    elif x < 0:
        return True
    print(p)
    return None

p1, p2, p3 = (4,-4), (0,0), (-4,-4)
print(foo(p1), foo(p2), foo(p3))
```

- A. (0, 0)
False None True
- B. False True
- C. False
(0, 0)
True
- D. (4, -4)
(0, 0)
(-4, -4)
- E. Executing this code yields an error

13. What is the output of the following code? [3 marks]

```
balance = 100
for i in range(15):
    if i > balance:
        break
    balance -= i

print(balance)
```

- A. 8
- B. 9
- C. 10
- D. 11
- E. 12

14. What is the output of the following code? **[3 marks]**

```
ans, count = 0, 0
while count < 4:
    ans = (ans + count) * (-1)**count
    count += 1

print(ans)
```

- A. -4
- B. -2
- C. 0
- D. 2
- E. Executing this code yields an error

15. What is the output of the following code? **[3 marks]**

```
num = 1490414

total = 0
for digit in str(num):
    if int(digit) % 2 != 0:
        total += int(int(digit)**0.5)
    else:
        total -= int(int(digit)**0.5)

print(total)
```

- A. -1
- B. 0
- C. 1
- D. 11
- E. Executing this code yields an error

16. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

```
[[1, 3, 5][1:]] * 2 + [7, 9]
```

- A. [3, 3, 7, 9]
- B. [3, 5, 3, 5, 7, 9]
- C. [[3], [3], 7, 9]
- D. [[3, 5], [3, 5], 7, 9]
- E. Evaluating this expression yields an error

17. What is the output of the following code? **[3 marks]**

```
tup1 = ([1,2,3],4,[5,6])
tup1[0][0] = 999
print(tup1[0])
```

- A. 1
- B. 999
- C. [1, 2, 3]
- D. [999, 2, 3]
- E. Executing this code yields an error

18. What is the output of the following code? **[3 marks]**

```
tup2 = (1,2,3,4,5,6,7,8,9,10)
print(tup2[4:])
```

- A. (5, 6, 7, 8, 9, 10)
- B. [5, 6, 7, 8, 9, 10]
- C. (4, 5, 6, 7, 8, 9, 10)
- D. [4, 5, 6, 7, 8, 9, 10]
- E. Executing this code yields an error

19. What is the output of the following code? **[3 marks]**

```
la = [9, 8, 7]
lb = [la, la]
lb[0][0] = 0
lc = [la, la, la]
lc[1][2] = 1
print(lb)
```

- A. [0, 8, 7, 9, 8, 7]
- B. [[0, 8, 1], [0, 8, 1]]
- C. [[0, 8, 7], [0, 8, 7]]
- D. [[0, 8, 7], [9, 8, 7]]
- E. Executing this code yields an error

20. What is the output of the following code? **[3 marks]**

```
t1 = ['a', 'b', 'c']
t2 = (t1,t1)
t1[1:] = ['x', 'y', 'z']
print(t2)
```

- A. (['a', 'b', 'c'], ['a', 'b', 'c'])
- B. (['a', 'x', 'c'], ['a', 'x', 'c'])
- C. (['a', 'x', 'y', 'z'], ['a', 'x', 'y', 'z'])
- D. (['a', 'x', 'y', 'z', 'b', 'c'], ['a', 'x', 'y', 'z', 'b', 'c'])
- E. Executing this code yields an error

21. What is the output of the following code? **[3 marks]**

```
coprimes = ()

for i in range(2, 6):
    for j in range(1, i):
        if i % j == 1:
            coprimes = coprimes + ((j,i),)

print(coprimes)
```

- A. ((2, 3), (3, 4), (2, 5), (4, 5))
- B. ((2, 3), (3, 4), (2, 5), (4, 5), (5, 6))
- C. ((1, 2), (2, 3), (3, 4), (2, 5), (4, 5))
- D. ((1, 2), (2, 3), (3, 4), (2, 5), (4, 5), (5, 6))
- E. Executing this code yields an error

22. The following Python expression is entered into a fresh Python shell with no prior import statements. Determine the result from evaluating the following expression. **[3 marks]**

```
len({5, 3, 8, 5, 9, 1, 8, 5, 9, 3})
```

- A. 4
- B. 5
- C. 6
- D. 9
- E. 10

23. What is the output of the following code? [3 marks]

```
sa = set('bananas')
sb = set('pyjamas')
lc = list('pineapple')
for c in sa & sb:
    if c not in lc:
        lc.append(c)
for c in sa ^ sb:
    if c in lc:
        lc.remove(c)
print(set(lc))
```

- A. set() # Empty set
- B. {'i', 'e', 'a', 'l', 's'}
- C. {'i', 'e', 'a', 'p', 'l', 's'}
- D. {'i', 'e', 'a', 'p', 'p', 'l', 'e', 's'}
- E. {'i', 'e', 'a', 'p', 'p', 'l', 'e', 'a', 's'}

24. What is the output of the following code? [3 marks]

```
def perimeter(sides):
    if sides == 0:
        return lambda r: 2 * 3.142 * r
    if sides >= 3:
        return lambda l: l * sides
    return 0

print(perimeter(5)(28))
```

- A. 175.952
- B. 140
- C. 112
- D. 0
- E. Executing this code yields an error

25. What is the output of the following code? [3 marks]

```
def multiplier(list, k):
    return [(i*k) for i in list]

print(multiplier(lambda a: [i for i in range(a)])(6), 3)

A. [3, 6, 9, 12, 15]
B. [3, 6, 9, 12, 15, 18]
C. [0, 3, 6, 9, 12, 15]
D. [0, 3, 6, 9, 12, 15, 18]
E. Executing this code yields an error
```

26. What is the output of the following code? [5 marks]

```
def foo(x, y):  
    n = 100  
    if x > n:  
        return bar(x, y)  
    return bar(y, x)  
  
def bar(x, y):  
    if x > n:  
        return x / y  
    return x - y  
  
n = 10  
print(foo(12, 24))
```

- A. -12
- B. 0.5
- C. 2.0
- D. 12
- E. Executing this code yields an error

27. Given the following recursive function:

```
def pascal(r, c):  
    print((r, c))  
    if r < c:  
        return 0  
    if r <= 1 or c <= 1:  
        return 1  
    return pascal(r-1, c) + pascal(r-1, c-1)
```

How many lines will be printed out for `pascal(5, 2)`? [5 marks]

- A. 7
- B. 8
- C. 9
- D. 10
- E. None of the above

28. Given the following function that takes in two string inputs:

```
def comb(s, t):  
    out = []  
    for c in s:  
        if c == ' ':  
            break  
        for d in t:  
            if d in s:  
                continue  
            out.append(c + d)  
    return out
```

What will the function call `comb ('bake cake', 'no lie')` do? **[5 marks]**

- A. Combine each letter from 'bake cake' with each letter from 'no lie'
- B. Combine each letter from 'bakecake' with each letter from 'nolie'
- C. Combine each letter from 'bakecake' with each letter from 'noli'
- D. Combine each letter from 'bake' with each letter from 'no'
- E. Combine each letter from 'bake' with each letter from 'noli'

29. What is the output of the following code? **[5 marks]**

```
play = {  
    'scissors':'paper',  
    'paper':'rock',  
    'rock':'lizard',  
    'lizard':'spock',  
    'spock':'scissors'}  
  
make = {  
    'scissors':'metal',  
    'paper':'wood',  
    'rock':'earth',  
    'lizard':'animal',  
    'spock':'vulcan'}  
  
print(make[play[play[play[play[play[play['rock']]]]]]]])
```

- A. animal
- B. earth
- C. metal
- D. vulcan
- E. wood

30. Given the following function that takes in two string inputs:

```
def foo(x, ds):  
    l = []  
    for k, v in ds.items():  
        if v == x:  
            l.append(k)  
    return l
```

Which of the following statements is true about the list `l` returned by `foo(x, ds)`? **[5 marks]**

- A. `l` is equivalent to `[ds[x]]`
- B. `l` is an empty list if `ds.get(x)` returns `None`
- C. `len(l) == len(set(l))`
- D. `len(l) > 0 == True` only if `x in ds == True`
- E. All of the above

-- End of Assessment --

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SOLUTIONS MANUAL

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Time allowed: 1 hour

MULTIPLE CHOICE QUESTIONS [100 marks]

1. A	2. B	3. B	4. A	5. C	6. A
7. B	8. D	9. A	10. B	11. C	12. A
13. B	14. A	15. A	16. D	17. D	18. A
19. B	20. C	21. A	22. B	23. C	24. B
25. C	26. C	27. C	28. E	29. A	30. C

-- End of Solutions Manual --