MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education Advanced Level
Higher 2

COMPUTING

9569/02

Paper 2 (Lab-based)

SPECIMEN INSERT

For Examination from 2020

3 hours

This document consists of **7** printed pages and **1** blank page.

Singapore Examinations and Assessment Board

CAMBRIDGE International Examinations

[Turn over

1 Python

1 Identifiers

When naming variables, functions and modules, the following rules must be observed:

- Names should begin with character 'a'–'z' or 'A'–'Z' or '_' and followed by alphanumeric characters or '_' .
- Reserved words should not be used.
- User-defined identifiers are case sensitive.

2 Comments and Documentation Strings

```
# This is a comment

"""
  This is a documentation string over multiple
  lines
"""
```

3 Input/Output

```
print ("This is a string")

s = input ("Instructions to prompt for data entry.")
```

4 Import

import <module>

from <module> **import** <name>

5 Data Type

Data Type	Notes
int	integer
float	real number
bool	boolean
str	string (immutable)
list	series of values
dict	key-value pairs
tuple	series of values (immutable)

6 Assignment

Assignment Statement	Notes
a = 1	integer
b = c	variable
d = "This is a string"	string
mylist = [1, 2, 3, 4, 5]	list
mydict = {'key': 'value'}	dict

7 Arithmetic Operators

Operator	Notes
+ –	plus, subtract
* /	multiply, divide
%	remainder or modulus
**	exponential or power
//	quotient of the floor division

8 Relational Operators

Operator	Notes
==	equality
!=	not equal to
> >=	greater than, greater than or equal to
< <=	less than, less than or equal to

9 Boolean Expression

Boolean Expression	Notes
a and b	logical and
a or b	logical or
not a	logical not

10 Iteration

while loop	for loop
while condition(s): <statement(s)>	**for** i **in** range(n): <statement(s)> **for** record **in** records: <statement(s)>

11 Selection

Type 1	Type 2	Type 3
if condition(s): <statement(s)>	**if** condition(s): <statement(s)> **else:** <statement(s)>	**if** condition(s): <statement(s)> **elif** condition(s): <statement(s)> **else:** <statement(s)>

12 Functions

```
# Function definitions
@<optional decorator(s)>
def <function name> (<parameters>):
    <function body>

# Function calls
<function name>(<value>, <name>=<value>)
```

13 Object-Oriented Programming

```
class <class name> (<optional parent class>):

    def __init__(self, <parameters>):
        <constructor body>

def <method name> (self, <parameters>):
    <method body>
```

14 Built-in Functions and Attributes

__file__	<file>.readlines()	<list>.copy()	print()	<str>.isdigit()
__name__	<file>.write()	<list>.index()	range()	<str>.islower()
abs()	float()	<list>.insert()	round()	<str>.isspace()
bin()	hex()	<list>.pop()	staticmethod()	<str>.isupper()
<bytes>.decode()	input()	<list>.remove()	str()	<str>.lower()
chr()	int()	<list>.reverse()	<str>.encode()	<str>.startswith()
<dict>.clear()	len()	<list>.sort()	<str>.endswith()	<str>.upper()
<dict>.copy()	list()	max()	<str>.format()	
<file>.close()	<list>.append()	min()	<str>.index()	
<file>.read()	<list>.extend()	open()	<str>.isalnum()	
<file>.readline()	<list>.clear()	ord()	<str>.isalpha()	

csv module	**datetime module**		**math module**
reader() writer() <writer>.writerow()	datetime() datetime.now() datetime.strptime() <datetime>.isoformat() <datetime>.strftime() <datetime>.year <datetime>.month	<datetime>.day <datetime>.hour <datetime>.minute <datetime>.second <timedelta>.days <timedelta>.seconds	ceil() exp() floor() log() pow() sqrt() trunc()

os.path module	**random module**	**sqlite3 module**	**socket module**	**sys module**
basename() dirname() isdir() isfile() join()	random() randint() randrange() shuffle()	connect() <connection>.commit() <connection>.close() <connection>.execute() <connection>.rollback() <connection>.row_factory <cursor>.fetchone() <cursor>.fetchall() Row	socket() bind() listen() accept() connect() recv() sendall()	exit()

15 Additional Functions and Attributes

pymongo module		**flask module**
MongoClient() <client>.database_names() <client>.get_database() <client>.drop_database() <client>.close() <database>.collection_names() <database>.get_collection() <database>.drop_collection() <collection>.insert_one() <collection>.insert_many() <collection>.find_one() <collection>.find()	<collection>.update_one() <collection>.update_many() <collection>.delete_one() <collection>.delete_many() <collection>.count() <cursor>.count()	Flask() <flask application>.route() <flask application>.run() render_template() request.files request.form request.method send_from_directory() redirect() url_for() secure_filename() <uploaded file>.save()

2 SQL Statements

```
CREATE TABLE table_name(
   column1_name COLUMN1_TYPE COLUMN1_CONSTRAINTS,
   column2_name COLUMN2_TYPE COLUMN2_CONSTRAINTS,
   ...
   PRIMARY KEY (column1_name, column2_name, ...),
   FOREIGN KEY (column_name) REFERENCES table_name(column_name)
);
```

```
SELECT column1_name, column2_name, ...
FROM table_name
WHERE where_expression
ORDER BY order_expression ASC;
```

```
SELECT column1_name, column2_name, ...
FROM table_name
WHERE where_expression
ORDER BY order_expression DESC;
```

```
SELECT table1_name.column1_name, table2_name.column2_name, ...
FROM table_name, table2_name
WHERE where_expression;
```

```
SELECT table1_name.column1_name, table2_name.column2_name, ...
FROM table1_name
INNER JOIN table2_name ON join_expression;
```

```
SELECT table1_name.column1_name, table2_name.column2_name, ...
FROM table1_name
LEFT OUTER JOIN table2_name ON join_expression;
```

```
SELECT
   COUNT(*),
   MAX(column1_name),
   MIN(column2_name),
   SUM(column3_name),
   ...
FROM table_name;
```

```
INSERT INTO table_name(column1_name, column2_name, ...)
VALUES(column1_value, column2_value, ...);
```

```
UPDATE table_name SET
   column1_name = column1_expression,
   column2_name = column2_expression,
   ...
WHERE where_expression;
```

```
DELETE FROM table_name
WHERE where_expression;
```

```
DROP TABLE table_name;
```

3 SQLite Types, Constraints, Functions and Operators

Types	Constraints	Functions	Operators			
NULL	NOT NULL	COUNT()	||	/	<	AND
REAL	PRIMARY KEY	MAX()	+	%	<=	OR
INTEGER	AUTOINCREMENT	MIN()	-	=	>	IS
TEXT	UNIQUE	SUM()	*	!=	>=	IS NOT

4 PyMongo Operators

Comparison

$eq	$gt	$gte	$lt	$lte
$ne	$in	$nin		

Logical

$and	$not	$or

Element

$exists

Update

$set	$unset

5 HTML Elements, Attributes and Character References

The first line of a HTML document must be: <!doctype html>

Type	Elements	Attributes
Common		id, class
Required	<html>, <head>, <title>, <body>	
Metadata	<link>	rel, href
Structure	<h1>, <h2>, <h3>, <p>, , , <hr>	
Text and Media	<b>, <i>	
	<a>	href
	<img>	src, alt
Table	<table>, <tr>, <th>, <td>	
Form	<form>	action, enctype, method
	<input>	name, type, value
	<textarea>	name

Character	&	<	>	"
Reference	&amp;	&lt;	&gt;	&quot;

6 Jinja2 Filters

length	safe

7 CSS Properties

Common	Box Model		Typography
display background color	height width border border-bottom border-left border-right border-top margin margin-bottom	margin-left margin-right margin-top padding padding-bottom padding-left padding-right padding-top	font-family font-size font-style font-weight text-align text-decoration