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CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
General Certificate of Education Advanced Level
Higher 2



COMPUTING

Paper 2 (Lab-based)

INSERT

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3 hours



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



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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
if condition(s): <statement(s)>

Type 2
if condition(s): <statement(s)> else: <statement(s)>

Type 3
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

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

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

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

15 Additional Functions and Attributes

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



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>, <div>, , <hr>	
Text and Media	, <i>	
	<a>	href
		src, alt
Table	<table>, <tr>, <th>, <td>	
Form	<form>	action, enctype, method
	<input>	name, type, value
	<textarea>	name

Character	&	<	>	"
Reference	&	<	>	"

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



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