

# GRADE 9 ICT – Final STUDY GUIDE

(Covers Python + Unit 2 Lesson 1)

## PART 1: PYTHON BASICS

### 1. Variables and Data Types

A variable is a container used to store information in a program.

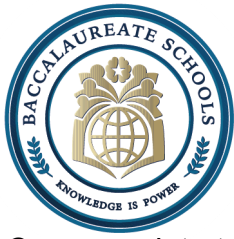
Examples:

```
name = "Ahmad"
```

```
age = 15
```

Rules for naming variables:

- Only letters, numbers, and underscore
- Cannot start with a number
- Cannot contain spaces
- Cannot use Python keywords (if, for, print, etc.)
- Use clear names (student\_name, total\_price)



Common data types:

- int: whole numbers (1, 20, 300)
- float: decimal numbers (2.5, 0.1, 89.99)
- str: text inside quotes ("hello")
- list: multiple values in brackets

Check type:

`type(age)`

## 2. Strings

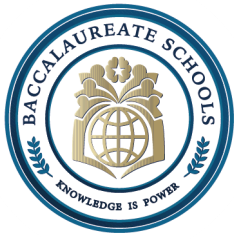
Strings are text written inside quotation marks.

Example:

`message = "Hello"`

Useful string methods:

- `upper()`: converts to uppercase
- `lower()`: converts to lowercase



- `title()`: capitalizes each word
- `strip()`: removes spaces from both sides
- `lstrip()`: removes left spaces
- `rstrip()`: removes right spaces

Example:

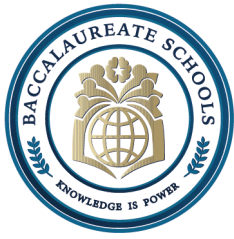
```
" hello ".strip()    # "hello"  
"world".upper()     # "WORLD"
```

String formatting (f-strings):

```
name = "Lana"  
print(f"My name is {name}")
```

Special characters:

- `\n` = new line
- `\t` = tab



### 3. Numbers and Operators

Number types:

- int
- float

Arithmetic operators:

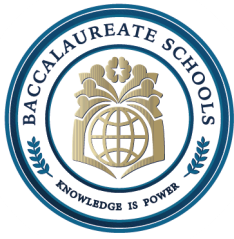
- addition
- subtraction
- multiplication
- / division
- % remainder
- \*\* exponent (power)

Examples:

$5 + 3$     # 8

$7 \% 2$     # 1

$2 ** 3$     # 8



## 4. Input from the User

The input() function allows the user to enter data.

Example:

```
name = input("Enter your name: ")
```

**Input is always a string. To convert:**

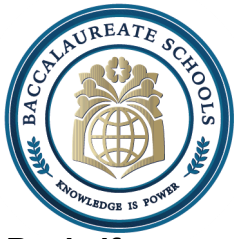
```
age = int(input("Enter age: "))
```

```
price = float(input("Enter price: "))
```

## 5. Conditionals (if statements)

Comparison operators:

- == equal
- != not equal
- greater
- < less
- = greater or equal
- <= less or equal



### Basic if:

```
if age >= 18:  
    print("Adult")
```

### If-else:

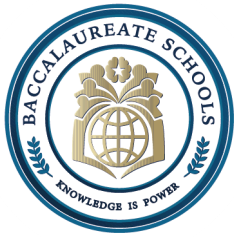
```
if grade >= 50:  
    print("Pass")  
else:  
    print("Fail")
```

### If-elif-else:

```
if score >= 90:  
    print("A")  
elif score >= 80:  
    print("B")  
else:  
    print("C or below")
```

### Logical operators:

- and
- or
- not



Example:

```
if color == "red" or color == "blue":  
    print("Primary color")
```

Check membership:

```
if "apple" in fruits:  
    print("Found")
```

## 6. Loops

### For loop

Used when repeating a known number of times.

Example:

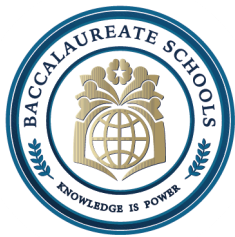
```
for i in range(5):  
    print(i)
```

Range with start and end:

```
for i in range(1, 6):  
    print(i)
```

### While loop

Runs while a condition is true.



Example:

```
count = 1
while count <= 5:
    print(count)
    count += 1
```

### **Nested loops**

A loop inside a loop.

```
for i in range(3):
    for j in range(2):
        print(i, j)
```

## **7. Using Google Colab**

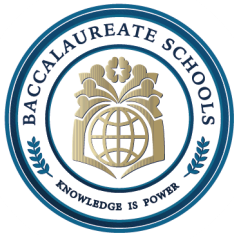
Google Colab allows:

- Running Python online
- No installation needed
- Automatic saving in Google Drive
- Suitable for school assignments

## **PART 2: UNIT 2 – LESSON 1**

Artificial Intelligence (AI) and Data Science (DS)





## 1. What is Data?

Data is information such as:

- Text
- Numbers
- Images
- Sound
- Video

Data becomes meaningful only after analysis.

## 2. Big Data

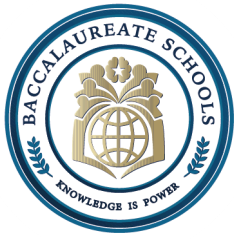
Big Data refers to extremely large amounts of data that are:

- Too big
- Too fast
- Too complex

for humans to process manually.

Examples:

- YouTube video history



- Instagram likes
- GPS data from millions of devices
- Hospital records

Big Data requires AI and Data Science to analyze it.

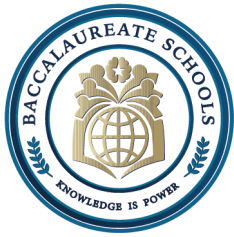
### 3. Artificial Intelligence (AI)

AI is when computers:

- Learn from experience
- Make decisions
- Perform tasks without exact step-by-step instructions

Examples of AI:

- Face recognition
- Voice assistants
- Game opponents
- Self-driving cars



- Autocorrect
- Recommendation systems (YouTube, Netflix)

## 4. Data Science (DS)

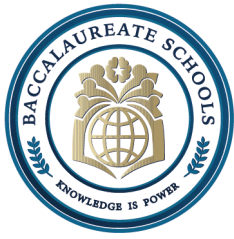
Data Science is the field that:

- Collects data
- Cleans data
- Analyzes data
- Finds patterns
- Makes predictions

Examples:

- Identifying diseases from MRI scans
- Predicting heart attacks
- Recommending videos or products
- Understanding customer behavior

## 5. Relationship Between AI and DS



AI needs data to learn.

DS prepares and analyzes data.

Together they create intelligent systems.

General process:

Big Data → Data Science → AI Model → Prediction/Recommendation

Example:

- Netflix collects your watching history (Data Science)
- AI recommends movies based on patterns

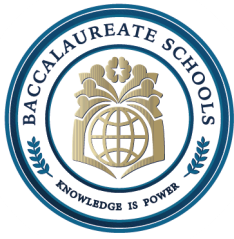
## 6. Applications of AI and DS

### Healthcare

- Reading CT and MRI scans
- Detecting diseases early
- Tracking patient data
- Smartwatches measuring heart activity

### Communication

- Translators



- Chatbots
- Voice assistants
- Speech recognition

### Entertainment

- Movie and music recommendations
- Game difficulty adjustment
- AI that guesses drawings

### Daily life

- Smart home devices
- Weather checks
- Smart speakers
- Automated reminders

## 7. AI in Gaming

AI can:

- Control NPCs
- Adjust game difficulty
- Predict player's actions
- Improve gameplay experience

Example:

In the "Quick, Draw!" game, AI tries to guess your drawing by comparing it to thousands of previous drawings.

## 8. Smart Homes

Smart home devices use AI to perform actions such as:

- Controlling lights
- Checking weather
- Playing music
- Answering questions

These devices connect to the internet and respond to voice commands.