BTEC Level 3 Computing

Unit 1 - Principles of Computer Science

Event Driven Programming

Event Driven Programming

What is Event-Driven Programming?

Programs that respond to events (like clicking a button).

Wait for something to happen, then react to it.

Like a waiter responding to customer requests.

Examples: Mobile apps, video games, desktop applications.

Main Structures

- Main Loop.
- Callback Function.
- Sub-Routines.

Structure: Main Loop

Constantly checks for new events.

Like a security guard watching for activity.

Structure: Main Loop Example

```
while program_is_running:
    check_for_events()
    handle_events()
```

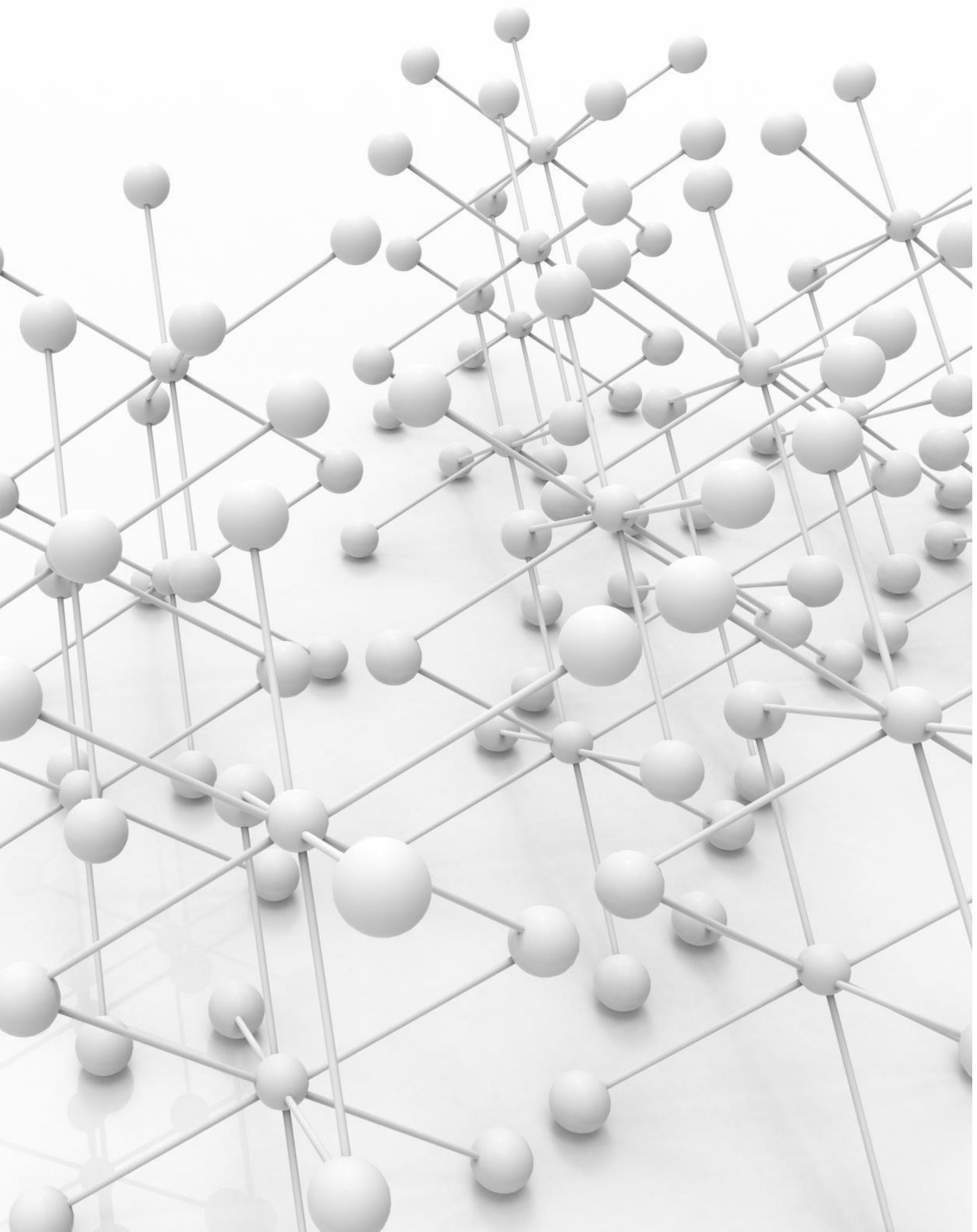
Structure: Callback Functions

Functions that run when an event happens.

Like telling a friend "Call me back when dinner is ready."

Structure: Callback Functions Example

```
def button_clicked():
    print("You clicked the button!")
button.on_click(button_clicked) # Callback registration
```

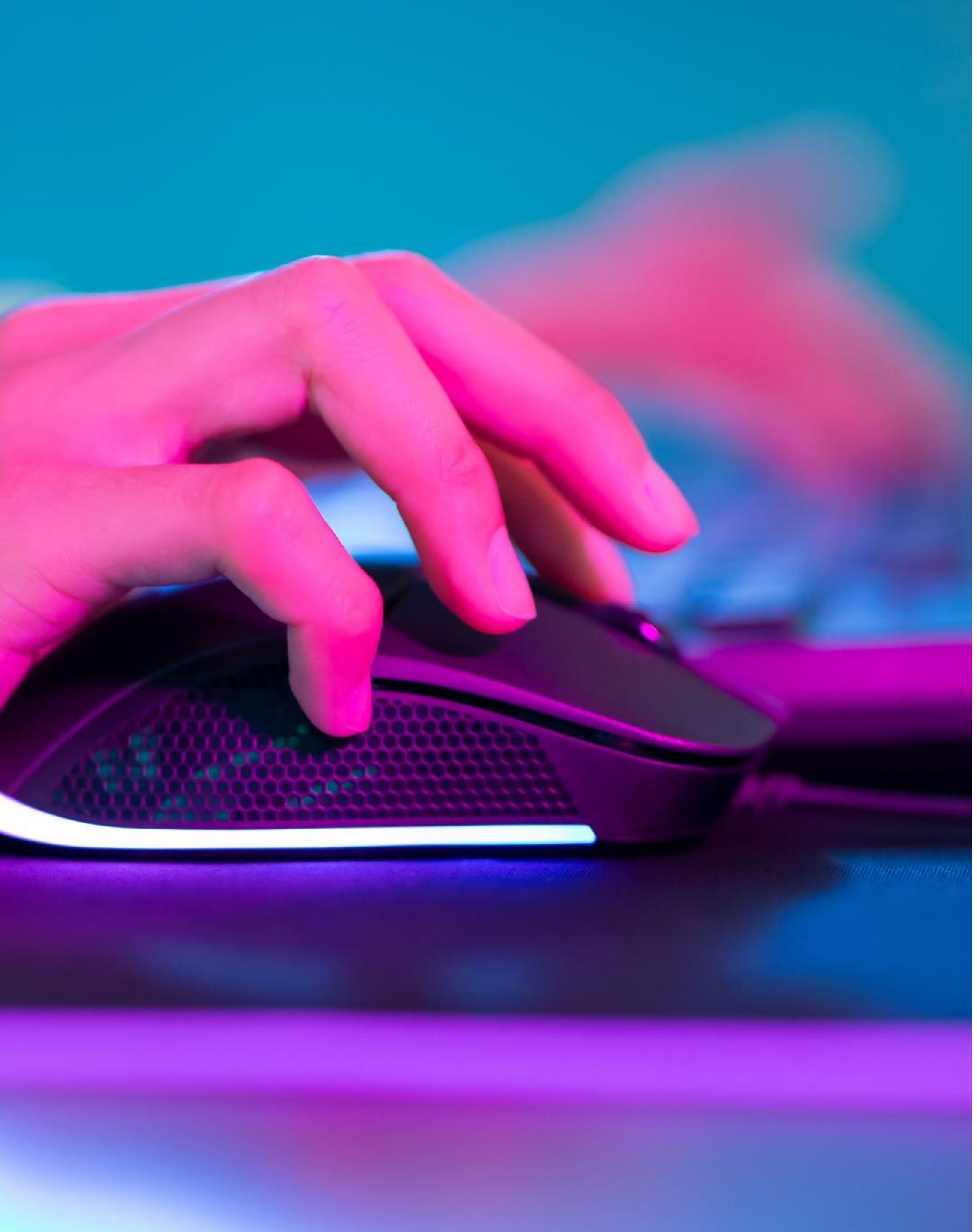


Structure: Sub-routines

- Small tasks that support event handling.
- Break down complex actions into simple steps.

Structure: Sub-routines Examples

```
def save_user_data():
    check_data()
    write_to_database()
    show_success_message()
```



Feature: Events

- Actions or occurrences in your program.

- Examples:
- Mouse clicks.
- Keyboard presses.
- Timer completing.
- Message received.
- Screen touch.

Feature: Event Handlers

- Code that runs when an event occurs.
- Like a recipe for what to do.

Feature: Event Handlers Example

```
def handle_login_button(username, password):
    if username and password:
        login_user()
    else:
        show_error()
```

Feature: Event Loops

Continuously checks for new events.

Distributes events to correct handlers.

Feature: Event Loops Example

```
while True:
    event = get_next_event()
    if event.type == "MOUSE_CLICK":
        handle_mouse_click()
    elif event.type == "KEY_PRESS":
        handle_key_press()
```

Feature: Service-Oriented Processing

- Breaking program into separate services.
- Each service handles specific events.
- Like different departments in a company.
- Example:
- Print Service: Handles print requests.
- Email Service: Handles email events.
- Save Service: Handles save operations.

Feature: Time-Driven Events

Events that occur at specific times.

Or after a certain delay.

Feature: Time-Driven Events Examples

```
def remind_user():
    show_message("Time for a break!") set_timer(30_minutes, remind_user)
```

Feature: Trigger Functions

Functions that start events.

Like pushing a domino to start a chain reaction.

Feature: Trigger Functions Example

```
def start_game():
    trigger_game_start_event()
    initialize_players()
    start_timer()
```

Event Driven Real World Examples

- Button clicks in mobile apps.
- Form submissions on websites.
- Game character movement.
- Chat message notifications.
- Auto-save in text editors.

Advantages Of Event Driven Programming

- Better user interaction.
- Responsive applications.
- Efficient resource use.
- Easy to maintain.
- Natural way to handle user input.

Disadvantages Of Event Driven Programming

- Complexity: Harder to debug, flow is less clear.
- Understanding: Code can be scattered, hard to see the big picture.
- Shared Data: Managing data between handlers is tricky.
- Testing: Simulating events is difficult.
- Callbacks: Nested callbacks can be messy.
- Control: Flow is inverted, can be confusing.
- Resources: Handlers might consume resources unnecessarily.

Next Time

Coding For The Web