PROBLEM STATEMENT

Businesses and freelancers frequently need to generate invoices for clients . Many existing tools are paid or too complex for small-scale users. The goal is to build a simple, efficient and customizable Python-based Invoice Generator that allows users to input customer details , item details, and automatically generate a PDF invoice.

PROJECT OBJECTIVES

- o   Build an end-to-end invoice generation system using python.
- o   Automate the creation of professional PDF invoices
- o   Provide a clear workflow with input validation
- o   Implement modular codebase with multiple functional modules
- o   Deliver proper documentation, diagrams, and GitHub structure

FUNCTIONAL REQUIREMENTS:

Module 1 – User Input Module

- o   Accept customer details
- o   Accept invoice number and date
- o   Collect multiple items (description, qty, price)
- o   Validate inputs

Module 2 – Processing Module

- o   Calculate per-item total
- o   Calculate invoice grand total
- o   Apply formatting rules
- o   Store invoice data in JSON/CSV

Module 3 – PDF Generation Module

- o   Use ReportLab
- o   Generate a professional invoice layout
- o   Save invoice as PDF
- o   Display confirmation

NON-FUNCTIONAL REQUIREMENTS:

Usability: Simple CLI interface

Performance: Generate invoice PDF within a very short time

Reliability: Validation prevents malformed invoices

Maintainability: Modular code with separation of concerns

Security: Sanitization for user inputs

Scalability: Easy to add GUI or web interface later

CODE:

```python
from reportlab.lib.pagesizes import A4

from reportlab.platypus import SimpleDocTemplate, Table, TableStyle, Paragraph, Spacer

from reportlab.lib import colors

from reportlab.lib.styles import getSampleStyleSheet

from datetime import datetime




def generate_invoice(invoice_number, customer_name, items, output_file="invoice.pdf"):
    """
    items = [
        {"item": "Product A", "qty": 2, "price": 50},
        {"item": "Product B", "qty": 1, "price": 100}
    ]
    """

    styles = getSampleStyleSheet()
    pdf = SimpleDocTemplate(output_file, pagesize=A4)


    content = []


    title = Paragraph(f"<b>INVOICE</b>", styles['Title'])
    content.append(title)
    content.append(Spacer(1, 12))
```

```python
info = Paragraph(
    f"""
    <b>Invoice Number:</b> {invoice_number}<br/>
    <b>Date:</b> {datetime.now().strftime('%Y-%m-%d')}<br/>
    <b>Customer:</b> {customer_name}
    """,
    styles["Normal"]
)
content.append(info)
content.append(Spacer(1, 20))


data = [["Item", "Qty", "Unit Price", "Total"]]

total_amount = 0

for entry in items:
    item = entry["item"]
    qty = entry["qty"]
    price = entry["price"]
    line_total = qty * price
    total_amount += line_total

    data.append([item, qty, f"${price:,.2f}", f"${line_total:,.2f}"])


data.append(["", "", "Grand Total", f"${total_amount:,.2f}"])
```

```python
    table = Table(data)

    table.setStyle(TableStyle([

        ("BACKGROUND", (0, 0), (-1, 0), colors.lightgrey),

        ("TEXTCOLOR", (0, 0), (-1, 0), colors.black),

        ("ALIGN", (1, 1), (-1, -1), "CENTER"),

        ("GRID", (0, 0), (-1, -1), 0.5, colors.grey),

        ("FONTNAME", (0, 0), (-1, 0), "Helvetica-Bold"),

        ("BACKGROUND", (0, -1), (-1, -1), colors.lightgrey)

    ]))


    content.append(table)

    content.append(Spacer(1, 20))



    footer = Paragraph("<i>Thank you for your business!</i>", styles["Normal"])

    content.append(footer)



    pdf.build(content)

    print(f"Invoice saved as: {output_file}")



if _name_ == "_main_":

    items = [

        {"item": "Web Design", "qty": 1, "price": 500},

        {"item": "Maintenance", "qty": 2, "price": 75}

    ]
```

```
generate_invoice(

    invoice_number="INV-001",

    customer_name="John Doe",

    items=items,

    output_file="invoice.pdf"

)
```

OUTPUT:

INVOICE

Acme Tech Solutions
123 Innovation Drive, Tech City
Email: billing@acmetech.com
Phone: +91 98765 43210

Bill To:
Innovate Solutions Inc.
John Smith
789 Creative Lane, Innovation Park
GSTIN: 07ABCD1234E5Z6

Invoice Number:	INV-2025-002
Invoice Date:	25/11/2025
Payment Due:	05/12/2025

#	Description	Qty	Rate (■)	Amount (■)
1	Website Redesign Project	1	■ 35,000.00	■ 35,000.00
2	Content Creation (5 articles)	5	■ 2,000.00	■ 10,000.00
3	SEO Consultation (8 hours)	8	■ 1,000.00	■ 8,000.00

Subtotal:	■ 53,000.00
18% GST	■ 9,540.00
GRAND TOTAL:	**■ 62,540.00**

Notes: Payment is expected within 10 days of the invoice date. Thank you!

Authorized Signature

PDF LINK:

https://p3b1rr8mbee-496ff2e9c6d22116-0-colab.googleusercontent.com/c502e25e-994a-4ea9-a012-6c0dcb15504d