

**COURSEWORK**

Program : [X] Diploma in Information Technology

[X] Diploma in Computer Science

Subject : PROGRAMMING CONCEPTS & PROBLEM SOLVING

Subject code : DIT 1253

Due Date : Week 10 (27 October 2025)

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| --- | --- |
| **NAME** | **STUDENT ID** |
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**SDS ACADEMIC INTEGRITY STATEMENT**

Sunway Diploma Studies is committed to the principles of academic integrity. Academic integrity means placing five fundamental values: **honesty, trust, fairness, respect, and responsibility** into practice.  It is being honest in the academic work you do at the programme/college, being fair to others, and taking responsibility for learning, and acting in an ethical manner in all your academic endeavours. We believe that these five values are truly foundational to the programme.

We hereby declare that:

1. We fully understand and will uphold the academic integrity of Sunway Diploma Studies (SDS).
2. We confirm that the work hereby submitted is our own original work and where other people’s work has been used this has been fully acknowledged.
3. We are aware of the importance of conducting exams with integrity and fairness, and We hereby confirm that We will comply with the requirements.
4. We are aware that non-compliance with these instructions and unfair conduct constitute a disciplinary offense, and actions will be taken including but not limited to being expelled.

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| **No** | **Name** | **Signature** | **Date** |
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**Group Member Contribution Form**

**INSTRUCTION**

The contribution must be signed by all members. 3 marks will be deducted from the total marks awarded if the group fail to comply with this requirement

Group Name: ­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- |
| **Student Name** | **Student ID** | **Signature** | **Role & Responsibilities**  **(e.g. create flow chart, C++ coding etc)** |
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**SLO-ASSESSMENTS MAPPING** **TABLE**

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| --- | --- | --- |
| **No.** | **Subject Learning Outcomes** | **Assessments** |
| 2 | Distinguish various problem solving tools in the problem-solving process for computer. (C2, PLO2) | Project: Flowchart / Pseudocode. |
| 3 | Build short programs that use standard conditional and iterative control structures and functions. (P3, PLO6) | Project: C++ program. |

**INSTRUCTION**

You are required to complete the question below. Name your C++ program file as **GroupName\_COURSE.cpp** (for example: group10\_DIIT.cpp, group2\_DCSI.cpp only one submission per group), filename should be **without spaces and not more than 15 characters**. You are required to:

* Submit the **softcopy** of the C++ program file (\*.cpp) to eLearn. (Note: only the ‘.cpp’ file, not the whole project).
* Besides that, you also need to submit the **softcopy** of the project documentation (.docx or .pdf) which contains the following:

1. Cover page
2. SDS Academic Integrity Statement
3. Group contribution form
4. Marking scheme
5. PAC (Problem Analysis Chart)
6. Flowchart
7. C++ source code
8. Sample output (screenshots)

For project documentation, please name your document as **GroupName\_COURSE.pdf** (for example: group10\_DIIT.pdf, group2\_DCSI.pdf only one submission per group), filename should be **without spaces and not more than 15 characters**.

**Important: Marks will be deducted for not adhering to the instructions.**

This project will contribute **35%** to your final grade.

This is a group project (maximum FIVE students in a group).

**Question**

Sunway Tech Hub is organizing Gadget Expo 2025, a technology fair showcasing the latest in electronics, smart devices, and accessories.

Your team has been hired to build a sales registration system for vendors selling gadgets at the expo. The system should allow customers to buy products, apply applicable discounts, and generate a final sales summary.

The pricing rules are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product Code | Product Name | Base Price (Normal) | Early Bird Discount | Student Discount | Senior Discount (60+) |
| 1 | Smartwatch Pro | RM 350 | 10% | 15% | 5% |
| 2 | Wireless Earbuds | RM 200 | 12% | 10% | 5% |
| 3 | Smart Home Kit | RM 500 | 15% | 12% | 8% |
| 4 | Gaming Keyboard | RM 250 | 8% | 10% | 5% |
| 5 | 4K Action Camera | RM 800 | 10% | 8% | 6% |
| 6 | Portable Projector | RM 600 | 12% | 10% | 7% |

***Early Bird Period***

* The Early Bird discount is valid only if the purchase date is on or before 15 November 2025.
* In your program, prompt the user to enter the purchase date and compare it with the cut-off date to determine eligibility.

**Program Requirements**

1. Display the product list along with pricing and discount rules.
2. Allow multiple purchases in a single transaction.
3. For each customer, collect the following details:
   * Name
   * IC/Passport Number (must be unique)
   * Age
   * Product Code
   * Purchase Type (Early Bird / Normal)
   * Student status (Yes/No).
4. Validate inputs:
   * Age > 0
   * Product code exists
   * No duplicate IC/Passport numbers.
5. Calculate final price:
   * Start from base price
   * Apply early bird discount if selected
   * Apply student or senior discount if eligible.
6. Display a sales receipt:
   * Customer details and final price.
   * Grand total for all purchases.

NOTES:

1. \*\*You are encouraged to improve your code structure by using any additional controls,

validations, or messages, which you deem appropriate.

2. You are allowed to have variances of display design, arrangement or format, as long as

it fulfils the requirements stated above.

3. Include internal comments where possible within your code.

**\*\* optional**

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| --- | --- | --- |
| Criteria | Requirement Coverage | Marks Allocation |
| Technical Correctness | * Display product list & pricing rules * Allow multiple purchases per transaction * Display sales receipt with customer details & grand total | 30 |
| Problem Solving Logic | * Validate inputs (age, product code, unique IC) * Correct calculation of final price with discount rules (Early Bird date check, Student/Senior discounts) | 20 |
| Solution Design (PAC & Flowchart) | * Program structure reflects requirements 1–6; * PAC and flowchart must match actual logic implemented | 30 |
| Comments & Documentation | Internal code comments explaining key logic (e.g., discount calculation, validation) | 10 |
| Best Practices | Coding style, variable naming, indentation, maintainability | 10 |
| Total |  | 100 |

**Marking Scheme**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | **Requirement Coverage** | **Exceeds Requirements** | **Meets Requirements** | **Basic Requirements** | **Marks** | |
| **Technical Correctness**  **(30 marks)** | * Display product list & pricing rules * Allow multiple purchases per transaction * Display of sales receipt with customer details & grand total | **(24–30)**  No syntax/logic errors;  all features work;  output matches specifications exactly; handles all test cases. | **(15–23)**  Minor syntax/logic issues;  most features work;  minor display mismatches. | **(0–14)**  Many errors;  key features missing; incorrect output for most cases. | /30 | |
| **Problem Solving Logic (20 marks)** | * Validate inputs (age, product code, unique IC) * Correct calculation of final price with discount rules (Early Bird date check, Student/Senior discounts) | **(16–20)**  All validations & calculations correct;  discount logic fully correct. | **(11–15)**  Most validations work; calculation correct for most cases;  minor discount logic errors. | **(0–10)**  Major validation gaps; incorrect discount calculation;  fails many scenarios. | /20 | |
| **Solution Design –**  **PAC & Flowchart**  **(30 marks)** | PAC and flowchart reflect actual code logic; covers requirements 1–6 | **(24–30)**  Clear PAC;  accurate flowchart;  correct symbols;  complete logic representation. | **(15–23)**  PAC & flowchart mostly correct; minor symbol errors. | **(0–14)**  Poorly structured; major flowchart errors; incomplete representation. | /30 | |
| **Comments & Documentation**  **(10 marks)** | Internal code comments; final report clarity | **(8–10)**  Helpful, well-placed comments; clearly explain logic; documentation clear. | **(5–7)**  Some helpful comments; placement inconsistent; documentation mostly clear. | **(0–4)**  Few/no comments; poor documentation. | /10 | |
| **Best Practices**  **(10 marks)** | Coding style, variable naming, indentation, maintainability | **(8–10)**  Consistent, readable, professional style; efficient structure. | **(5–7)**  Some inconsistencies but still readable; acceptable structure. | **(0–4)**  Poor formatting; unclear naming; unstructured code. | /10 | |
| **TOTAL** | | | | | | **/100** | |

**End of question paper**