



# Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Examination, Summer 2025

Course Code: CSE113, Course Title: Programming and Problem Solving

Level: 1 Term: 2 Batch: 68

Time: 02:00 Hrs

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1. | <p>Identify the errors in the following code? Explain the errors and reasons why you think they are errors.</p> <pre> a) 1. #include &lt;stdio.h&gt;     2. void swap(int *a, int b) {     3.     if (*a != *b) {     4.         int temp = *a;     5.         a = *b;     6.         *b = temp;     7.     }     8. }     9. int max(int a, int *b) {     10.     return (*a &gt; *b) ? *a : b;     11. }     12. int main() {     13.     int x, y;     14.     scanf("%d%d", &amp;x &amp;y);     15.     swap(&amp;x, &amp;y);     16.     int maximum = max(&amp;x, y);     17.     printf("The greater value is: %d\n", maximum);     18.     return 0;     19. }</pre>                                                                                       | <p>03</p> <p>CO2</p>      |
| 2. | <p>Generate the output of given codes below (write only the output segment in a box):</p> <pre> a) #include &lt;stdio.h&gt; void printPattern(int n) {     int i, j;     for (i = 1; i &lt;= n; i += 2) {         for (j = 1; j &lt;= i; j++) {             printf("* ");         }         printf("\n");     } } int main() {     printPattern(5);     return 0; }  b) #include &lt;stdio.h&gt; void increase(int *x) { *x *= 2; } void decrement(int *x) { (*x)--; } void process(int *a, int *b) {     increase(a);     decrement(b);     int temp = *a; *a = *b; *b = temp; } int main() {     int m = 7, n = 3;     process(&amp;m, &amp;n);     printf("%d\n", m);     printf("%d\n", n);     increase(&amp;m);     printf("%d\n", m);     return 0; }</pre> | <p>03 + 03</p> <p>CO3</p> |

| <p>c) <pre>#include &lt;stdio.h&gt; struct Book {     int pages;     float price;     struct Book *next; };  void updateBook(struct Book *b) {     b-&gt;pages += 50;     b-&gt;price -= 10.5; }  void displayBook(struct Book *b) {     printf("%d\n%.2f\n", b-&gt;pages, b-&gt;price); }  int main() {     struct Book book1 = {100, 200.0, NULL};     struct Book book2 = {150, 300.0, NULL};     book1.next = &amp;book2;     updateBook(book1.next);     book1.pages -= 20;     printf("%d\n%.2f\n", book1.pages, book1.price);     displayBook(&amp;book1);     printf("%d\n%.2f\n", book1.next-&gt;pages, book1.next-&gt;price);     return 0; }</pre></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 03                                                                                 |               |                                                              |                                                                                    |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------|------------------------------------------------------------------------------------|----|
| <p>3. Identify the problem scenarios given below and write a complete <b>C program</b> for each problem statement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                    |               |                                                              |                                                                                    |    |
| <p>a) You have an array representing availability status of items in a warehouse (<b>1 means in stock, 0 means out of stock</b>). Write a recursive function in C programming language to count how many items are currently available.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains an integer <i>n</i> representing the number of items.</li><li>Second line contains <i>n</i> space-separated integers (each 0 or 1).</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the total count of available items.</li></ul> <table border="1"><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>6<br/>1 0 1 1 0 1</td><td>4</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                   | Sample Input                                                                       | Sample Output | 6<br>1 0 1 1 0 1                                             | 4                                                                                  | 04 |
| Sample Input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sample Output                                                                      |               |                                                              |                                                                                    |    |
| 6<br>1 0 1 1 0 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4                                                                                  |               |                                                              |                                                                                    |    |
| <p>b) Represent the warehouse inventory as a 2D array of integers where each row contains:</p> <ul style="list-style-type: none"><li>- Item ID (int)</li><li>- Quantity in stock (int)</li><li>- Year of manufacture (int)</li></ul> <p>Write a C program that will print the entire inventory and then print the details of the oldest manufactured item.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains an integer <i>n</i> representing the number of items.</li><li>Next <i>n</i> lines each contain three integers: <b>Item ID, Quantity, Year</b>.</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the inventory table (one item per line).</li><li>Print the oldest item's details in the format:<br/>"Oldest item: ID Quantity Year"</li></ul> <table border="1"><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>4<br/>301 15 2015<br/>302 10 2012<br/>303 20 2018<br/>304 5 2010</td><td>301 15 2015<br/>302 10 2012<br/>303 20 2018<br/>304 5 2010<br/>Oldest item: 304 5 2010</td></tr></table> | Sample Input                                                                       | Sample Output | 4<br>301 15 2015<br>302 10 2012<br>303 20 2018<br>304 5 2010 | 301 15 2015<br>302 10 2012<br>303 20 2018<br>304 5 2010<br>Oldest item: 304 5 2010 | 04 |
| Sample Input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sample Output                                                                      |               |                                                              |                                                                                    |    |
| 4<br>301 15 2015<br>302 10 2012<br>303 20 2018<br>304 5 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 301 15 2015<br>302 10 2012<br>303 20 2018<br>304 5 2010<br>Oldest item: 304 5 2010 |               |                                                              |                                                                                    |    |

| c)                                                             | <p>Given an array of product names, write a user-defined function that takes two strings as parameters, compares them, and finds and prints all product names that contain the given set of characters.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains a three characters string to search for.</li><li>Second line contains an integer <math>n</math> (number of product names).</li><li>Next <math>n</math> lines each contain a product name (string without spaces).</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print all product names that contain the given characters set.</li></ul> <table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>ers<br/>5<br/>Wrench<br/>Screwdrivers<br/>Hammers<br/>Saw<br/>Pliers</td><td>Screwdrivers<br/>Hammers<br/>Pliers</td></tr></table>                                                                          | Sample Input | Sample Output | ers<br>5<br>Wrench<br>Screwdrivers<br>Hammers<br>Saw<br>Pliers | Screwdrivers<br>Hammers<br>Pliers                    | 04 |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|----------------------------------------------------------------|------------------------------------------------------|----|
| Sample Input                                                   | Sample Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |               |                                                                |                                                      |    |
| ers<br>5<br>Wrench<br>Screwdrivers<br>Hammers<br>Saw<br>Pliers | Screwdrivers<br>Hammers<br>Pliers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |               |                                                                |                                                      |    |
| d)                                                             | <p>Write a program that converts all lowercase letters in a given product name to uppercase and all uppercase letters in lowercase format and prints it.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>One line containing the product name (string).</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the converted product name.</li></ul> <table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>ScrEwDrivEr</td><td>sCRewDRIVer</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                              | Sample Input | Sample Output | ScrEwDrivEr                                                    | sCRewDRIVer                                          | 04 |
| Sample Input                                                   | Sample Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |               |                                                                |                                                      |    |
| ScrEwDrivEr                                                    | sCRewDRIVer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                |                                                      |    |
| e)                                                             | <p>Write a program that define a structure <b>Item</b> with fields: ID (<b>int</b>), Name (<b>string</b>), Manufacturer (<b>string</b>), Availability (<b>bool</b>). Input the details of one item and display them.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>One line with <b>Item ID</b></li><li>One line with <b>Name</b> (string without spaces)</li><li>One line with <b>Manufacturer</b> (string without spaces)</li><li>One line with <b>Availability</b> (1 for available, 0 for unavailable)</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the item details in this format:<br/><b>ID: &lt;ID&gt; Name: &lt;Name&gt; Manufacturer: &lt;Manufacturer&gt; Available: &lt;Yes/No&gt;</b></li></ul> <table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>68<br/>Hammer<br/>CSE<br/>1</td><td>ID: 68 Name: Hammer Manufacturer: CSE Available: Yes</td></tr></table> | Sample Input | Sample Output | 68<br>Hammer<br>CSE<br>1                                       | ID: 68 Name: Hammer Manufacturer: CSE Available: Yes | 04 |
| Sample Input                                                   | Sample Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |               |                                                                |                                                      |    |
| 68<br>Hammer<br>CSE<br>1                                       | ID: 68 Name: Hammer Manufacturer: CSE Available: Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                                                                |                                                      |    |
| f)                                                             | <p>Write a program that input details of <math>n</math> items into an array of Item structures. Print the details of all available items.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains <math>n</math>, the number of items.</li><li>Next <math>n</math> blocks, each containing:<ul style="list-style-type: none"><li>Item ID</li></ul></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 05           |               |                                                                |                                                      |    |

- **Name** (string without spaces)
- **Manufacturer** (string without spaces)
- **Availability** (1 or 0)

**Output:**

- Print the details of all items with Availability = 1 in the format of problem (e).

| Sample Input | Sample Output                                                                                                                |
|--------------|------------------------------------------------------------------------------------------------------------------------------|
| 3            | ID: 601 Name: Drill Manufacturer: ToolCorp Available: Yes<br>ID: 603 Name: TapeMeasure Manufacturer: MetricCo Available: Yes |
| 601          |                                                                                                                              |
| Drill        |                                                                                                                              |
| ToolCorp     |                                                                                                                              |
| 1            |                                                                                                                              |
| 602          |                                                                                                                              |
| Level        |                                                                                                                              |
| BuildWell    |                                                                                                                              |
| 0            |                                                                                                                              |
| 603          |                                                                                                                              |
| TapeMeasure  |                                                                                                                              |
| MetricCo     |                                                                                                                              |
| 1            |                                                                                                                              |