

# Structure Related Problems

(Total 13 questions)

| SL                                                                                          | Problem statement                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Difficulty levels |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------|---|
| 1.                                                                                          | <p>Write a program (WAP) to take as input the name, student ID and CGPA of a student, and prints it.</p> <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>Mr. A<br/>011131144<br/>3.86</td><td>Name: Mr. A<br/>Student ID: 011131144<br/>CGPA: 3.86</td></tr></table>                                                                                                                                                                                        | Sample input      | Sample output | Mr. A<br>011131144<br>3.86                                                                  | Name: Mr. A<br>Student ID: 011131144<br>CGPA: 3.86                                                                                                                            | *          |                           |   |
| Sample input                                                                                | Sample output                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| Mr. A<br>011131144<br>3.86                                                                  | Name: Mr. A<br>Student ID: 011131144<br>CGPA: 3.86                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| 2.                                                                                          | <p>WAP to take as input names, student IDs and CGPA of n students, and print them.</p> <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3<br/>Mr. A<br/>011131144<br/>3.86<br/>Mr. B<br/>011131155<br/>3.76<br/>Mr. C<br/>011131166<br/>3.66</td><td>Student 1: Mr. A<br/>Student ID: 011131144<br/>CGPA: 3.86<br/>Student 2: Mr. B<br/>Student ID: 011131155<br/>CGPA: 3.76<br/>Student 3: Mr. C<br/>Student ID: 011131166<br/>CGPA: 3.66</td></tr></table> | Sample input      | Sample output | 3<br>Mr. A<br>011131144<br>3.86<br>Mr. B<br>011131155<br>3.76<br>Mr. C<br>011131166<br>3.66 | Student 1: Mr. A<br>Student ID: 011131144<br>CGPA: 3.86<br>Student 2: Mr. B<br>Student ID: 011131155<br>CGPA: 3.76<br>Student 3: Mr. C<br>Student ID: 011131166<br>CGPA: 3.66 | *          |                           |   |
| Sample input                                                                                | Sample output                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| 3<br>Mr. A<br>011131144<br>3.86<br>Mr. B<br>011131155<br>3.76<br>Mr. C<br>011131166<br>3.66 | Student 1: Mr. A<br>Student ID: 011131144<br>CGPA: 3.86<br>Student 2: Mr. B<br>Student ID: 011131155<br>CGPA: 3.76<br>Student 3: Mr. C<br>Student ID: 011131166<br>CGPA: 3.66                                                                                                                                                                                                                                                                                                  |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| 3.                                                                                          | <p>WAP to take as input the 2D coordinates (x,y) of two points and calculate the distance between them.</p> <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>0 0<br/>3 4</td><td>The distance is 5.00 unit</td></tr><tr><td>1 2<br/>2 3</td><td>The distance is 1.41 unit</td></tr></table>                                                                                                                                                                  | Sample input      | Sample output | 0 0<br>3 4                                                                                  | The distance is 5.00 unit                                                                                                                                                     | 1 2<br>2 3 | The distance is 1.41 unit | * |
| Sample input                                                                                | Sample output                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| 0 0<br>3 4                                                                                  | The distance is 5.00 unit                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |
| 1 2<br>2 3                                                                                  | The distance is 1.41 unit                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |               |                                                                                             |                                                                                                                                                                               |            |                           |   |

| 4.                                                                                                                                                                                                             | WAP to take as input the 2D coordinates (x,y) of three points and calculate the area of the triangle with the points taken as vertices. If no such triangle is possible, print “They are in the same line”. | *  |              |               |                   |                                       |                    |                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------|---------------|-------------------|---------------------------------------|--------------------|---------------------------|
| <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>0 0<br/>0 3<br/>3 4</td><td>The area is 6.00 unit</td></tr><tr><td>0 0<br/>2 3<br/>8 12</td><td>They are in the same line</td></tr></table> |                                                                                                                                                                                                             |    | Sample input | Sample output | 0 0<br>0 3<br>3 4 | The area is 6.00 unit                 | 0 0<br>2 3<br>8 12 | They are in the same line |
| Sample input                                                                                                                                                                                                   | Sample output                                                                                                                                                                                               |    |              |               |                   |                                       |                    |                           |
| 0 0<br>0 3<br>3 4                                                                                                                                                                                              | The area is 6.00 unit                                                                                                                                                                                       |    |              |               |                   |                                       |                    |                           |
| 0 0<br>2 3<br>8 12                                                                                                                                                                                             | They are in the same line                                                                                                                                                                                   |    |              |               |                   |                                       |                    |                           |
| 5.                                                                                                                                                                                                             | WAP to take as input the real and imaginary parts of a complex number, and print it in a+bi form.                                                                                                           | *  |              |               |                   |                                       |                    |                           |
| <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>5 6</td><td>5.00+6.00i</td></tr><tr><td>5 -6</td><td>5.00-6.00i</td></tr></table>                                                           |                                                                                                                                                                                                             |    | Sample input | Sample output | 5 6               | 5.00+6.00i                            | 5 -6               | 5.00-6.00i                |
| Sample input                                                                                                                                                                                                   | Sample output                                                                                                                                                                                               |    |              |               |                   |                                       |                    |                           |
| 5 6                                                                                                                                                                                                            | 5.00+6.00i                                                                                                                                                                                                  |    |              |               |                   |                                       |                    |                           |
| 5 -6                                                                                                                                                                                                           | 5.00-6.00i                                                                                                                                                                                                  |    |              |               |                   |                                       |                    |                           |
| 6.                                                                                                                                                                                                             | WAP to take as input the real and imaginary parts of a complex number, and calculate its modulus and argument.                                                                                              | ** |              |               |                   |                                       |                    |                           |
| <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 4</td><td>Modulus = 5.0000<br/>Argument = 0.9272</td></tr></table>                                                                        |                                                                                                                                                                                                             |    | Sample input | Sample output | 3 4               | Modulus = 5.0000<br>Argument = 0.9272 |                    |                           |
| Sample input                                                                                                                                                                                                   | Sample output                                                                                                                                                                                               |    |              |               |                   |                                       |                    |                           |
| 3 4                                                                                                                                                                                                            | Modulus = 5.0000<br>Argument = 0.9272                                                                                                                                                                       |    |              |               |                   |                                       |                    |                           |
| 7.                                                                                                                                                                                                             | WAP to take as input two complex numbers, and add and subtract them.                                                                                                                                        | *  |              |               |                   |                                       |                    |                           |
| <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 4</td><td>(3+4i)+(5-2i)=8+2i</td></tr><tr><td>5 -2</td><td>(3+4i)-(5-2i)=-2+6i</td></tr></table>                                          |                                                                                                                                                                                                             |    | Sample input | Sample output | 3 4               | (3+4i)+(5-2i)=8+2i                    | 5 -2               | (3+4i)-(5-2i)=-2+6i       |
| Sample input                                                                                                                                                                                                   | Sample output                                                                                                                                                                                               |    |              |               |                   |                                       |                    |                           |
| 3 4                                                                                                                                                                                                            | (3+4i)+(5-2i)=8+2i                                                                                                                                                                                          |    |              |               |                   |                                       |                    |                           |
| 5 -2                                                                                                                                                                                                           | (3+4i)-(5-2i)=-2+6i                                                                                                                                                                                         |    |              |               |                   |                                       |                    |                           |
| 8.                                                                                                                                                                                                             | WAP to take as input two complex numbers, and multiply them.                                                                                                                                                | ** |              |               |                   |                                       |                    |                           |
| <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 4</td><td>(3+4i)*(5-2i)=23+14i</td></tr><tr><td>5 -2</td><td></td></tr></table>                                                           |                                                                                                                                                                                                             |    | Sample input | Sample output | 3 4               | (3+4i)*(5-2i)=23+14i                  | 5 -2               |                           |
| Sample input                                                                                                                                                                                                   | Sample output                                                                                                                                                                                               |    |              |               |                   |                                       |                    |                           |
| 3 4                                                                                                                                                                                                            | (3+4i)*(5-2i)=23+14i                                                                                                                                                                                        |    |              |               |                   |                                       |                    |                           |
| 5 -2                                                                                                                                                                                                           |                                                                                                                                                                                                             |    |              |               |                   |                                       |                    |                           |

| 9.                 | WAP to take as input two complex numbers and divide them.                                                                                                                                                                                                                       | **           |               |                    |                                                                                                  |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|--------------------|--------------------------------------------------------------------------------------------------|--|
|                    | <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 4<br/>5 -2</td><td>(3+4i)/(5-2i) = 0.24+0.89i</td></tr></table>                                                                                                                                            | Sample input | Sample output | 3 4<br>5 -2        | (3+4i)/(5-2i) = 0.24+0.89i                                                                       |  |
| Sample input       | Sample output                                                                                                                                                                                                                                                                   |              |               |                    |                                                                                                  |  |
| 3 4<br>5 -2        | (3+4i)/(5-2i) = 0.24+0.89i                                                                                                                                                                                                                                                      |              |               |                    |                                                                                                  |  |
| 10.                | WAP to take as input the meter and centimeter components of a length, and show the length in meter and in centimeter.                                                                                                                                                           | *            |               |                    |                                                                                                  |  |
|                    | <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 15</td><td>Length in meter: 3.15<br/>Length in centimeter: 315</td></tr></table>                                                                                                                           | Sample input | Sample output | 3 15               | Length in meter: 3.15<br>Length in centimeter: 315                                               |  |
| Sample input       | Sample output                                                                                                                                                                                                                                                                   |              |               |                    |                                                                                                  |  |
| 3 15               | Length in meter: 3.15<br>Length in centimeter: 315                                                                                                                                                                                                                              |              |               |                    |                                                                                                  |  |
| 11.                | WAP to take as input two lengths as their meter and centimeter components, and calculate their sum <b>without calculating total meter and centimeter length</b> . (e.g. to add 3m 33cm and 7m 70cm, you cannot add 3.33m and 7.7m. You have to add the components individually) | **           |               |                    |                                                                                                  |  |
|                    | <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 33<br/>7 70</td><td>The sum is 11 meter 3 centimeter</td></tr></table>                                                                                                                                     | Sample input | Sample output | 3 33<br>7 70       | The sum is 11 meter 3 centimeter                                                                 |  |
| Sample input       | Sample output                                                                                                                                                                                                                                                                   |              |               |                    |                                                                                                  |  |
| 3 33<br>7 70       | The sum is 11 meter 3 centimeter                                                                                                                                                                                                                                                |              |               |                    |                                                                                                  |  |
| 12.                | WAP to take as input the hour, minute and second components of a time interval, and show the time interval in hour, in minute and in second.                                                                                                                                    | **           |               |                    |                                                                                                  |  |
|                    | <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 45 48</td><td>Time interval in hour: 3.76<br/>Time interval in minute: 225.80<br/>Time interval in second: 13584</td></tr></table>                                                                         | Sample input | Sample output | 3 45 48            | Time interval in hour: 3.76<br>Time interval in minute: 225.80<br>Time interval in second: 13584 |  |
| Sample input       | Sample output                                                                                                                                                                                                                                                                   |              |               |                    |                                                                                                  |  |
| 3 45 48            | Time interval in hour: 3.76<br>Time interval in minute: 225.80<br>Time interval in second: 13584                                                                                                                                                                                |              |               |                    |                                                                                                  |  |
| 13.                | WAP to take as input the hour, minute and second components of two times of a day, and find out their difference (assume the latest time is given first).                                                                                                                       | ***          |               |                    |                                                                                                  |  |
|                    | <table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3 45 48<br/>1 55 50</td><td>1 49 58</td></tr></table>                                                                                                                                                        | Sample input | Sample output | 3 45 48<br>1 55 50 | 1 49 58                                                                                          |  |
| Sample input       | Sample output                                                                                                                                                                                                                                                                   |              |               |                    |                                                                                                  |  |
| 3 45 48<br>1 55 50 | 1 49 58                                                                                                                                                                                                                                                                         |              |               |                    |                                                                                                  |  |