higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

BASIC PRINCIPLES OF COMPUTER PROGRAMMING AND COMPUTER LITERACY

NQF LEVEL 2

(Second paper)

(10041062)

4 December 2024 (Y-paper)
13:00–16:30

This question paper consists of 11 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
BASIC PRINCIPLES OF COMPUTER PROGRAMMING
AND COMPUTER LITERACY
NQF LEVEL 2
(Second paper)
TIME: 3½ HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.

2. Read all the questions carefully.

3. Number the answers according to the numbering system used in this question paper.

INSTRUCTIONS TO STUDENTS AND LECTURERS

1. Students must be seated in the computer laboratory 30 minutes before the start of the examination to ensure that all computers have the appropriate programs.

2. These questions must be completed on a computer by making use of:

   - MSWord
   - Scratch 3
   - Any applicable Python IDE (using Python version 3 and above)

   No handwritten code or hand drawn diagrams will be marked!

3. Students must make sure that they print their work immediately after completing a question. Ensure that your EXAMINATION NUMBER appears on each printout. No questions without a printed EXAMINATION NUMBER will be marked.

4. In the event of problems such as a power failure, computer breakdown or a printer breakdown, the invigilator will make the necessary arrangements to continue with the examination process once the problem has been resolved. Students will not be penalised with time lost under these circumstances.

5. All work on the computer should be saved at regular intervals to prevent loss of work. No additional time may be allowed for work lost due to lack of saving.

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6. No student may print his/her work for another student or make a memory stick available to another student or access another student's work on the network. Any attempt to access any information from or transfer information to another student in whatever manner is a contravention of the examination rules and regulations and will be viewed in an extremely serious light.

7. All printouts or screen prints done during the session must be handed in.

8. Make sure that your EXAMINATION NUMBER appears on all printouts.

9. Students may not copy the source code from the Python IDE code editor to MS Word and then print it from the word processor.

10. Steps to print a user interface or any other screenshot:

    10.1 Run the solution.

    10.2 Hold down the ALT key and press the print screen (Print Scrn) key.

    10.3 Open a blank MS Word document and paste the screenshot.

    10.4 Add your EXAMINATION NUMBER against the left margin.

    10.5 Make a printout of the page.

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QUESTION 1

Your local school is trying to raise funds to buy a 3D Printer for their new Robotics lab. They have decided to host a Concert to raise funds. They set the ticket price at R50. 5 teachers have decided to go into the community to sell tickets. The school requires you to develop a Scratch application to assist with their sales.

Your Scratch application must get the total number of tickets sold from each of the 5 salespeople. Each time a salesperson enters their amount, your application must update and show the total tickets sold and the current Sales amount.

The target is to get at least 100 tickets sold. Once the input has been captured, your application must display a message as follows:

- If the tickets sold are less than 100, Display 'Thank you' + Sales.
- Otherwise, Display 'Well done! Target Reached' + Sales.

You do not need to include any validation in your program and may assume that all input will be valid.

Use the IPO Chart below to assist you in completing the application:

INPUT	PROCESSING	OUTPUT
Tickets_sold	Sales = 0 Repeat for each salesperson Ask for tickets sold Tickets_sold=Tickets_sold+answer Sales = Tickets_sold * 50 If Tickets_sold < 100 then Display – 'Thank you' + Sales Otherwise Display – 'Well done! Target Reached' + Sales	Sales

Below is a screenshot of what the Scratch application should look like:



FIGURE 1.1

The following STEPS explain how the application should be used:

Step 1 Run the Scratch application. This process is repeated for each salesperson. As you enter the tickets sold, the variables displayed should update.

Eg. 10 Tickets then Sales change to 500



FIGURE 1.2

Step 2 Based on the number of tickets sold, the total sales is displayed with a message.

If sales < 100



FIGURE 1.3

If sales > 99



FIGURE 1.4

Follow the instructions below to create the Scratch application.

1.1 Create a Scratch application and set the Stage backdrop to Concert. (1)

1.2 Change the sprite to Singer 1. (1)

1.3 Declare and initialise all appropriate variables. (4)

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1.4 Refer to the question below to get user input.

HINT: Use the related calculation in the IPO chart.

1.4.1 Create a loop using the **repeat block** to prompt each salesperson for the number of tickets sold. (4)

1.4.2 Update the **Tickets** variable. (3)

1.4.3 Update the **Sales** variable. (3)

1.5 Display an appropriate message along with the Sales, to the user for 5 seconds. (10)

1.6 Print out your code:
Make a screenshot of your Scratch code and paste it into MS Word.
Include the heading QUESTION 1 and your EXAMINATION NUMBER. (1)

1.7 Test your program with the following values:

- 20
- 45
- 38
- 12
- 25

The output must show the message and variables. See FIGURE 1.3 and 1.4. Make a screenshot of your output and paste it into MS Word. Include the heading QUESTION 1 and your EXAMINATION NUMBER. Print out your document. (3)

SAVE your Scratch program as: Question1_EXAMINATION_NUMBER.sb3 using your EXAMINATION NUMBER.

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QUESTION 2

Study the following Turtle graphics program output. There are 8 triangles drawn to form an octagon-like shape.

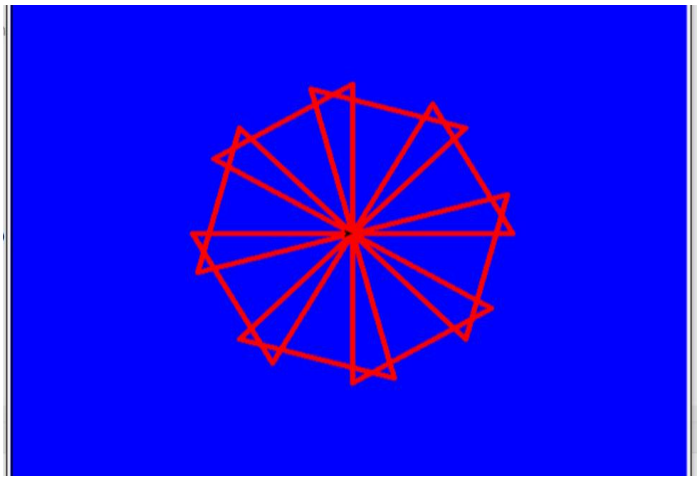


FIGURE 2.1

Write the code in Python using the Turtle graphics library to draw a shape that will resemble the one above.

2.1 Add your EXAMINATION NUMBER as a comment in the code. (1)

2.2 Your turtle should start the drawing in the middle of the graphics window. (2)

2.3 Change the background colour of the Python Turtle Graphics window to blue. (2)

2.4 Change the pen colour of the turtle to red. (2)

2.5 Draw the shape as shown in FIGURE 2.1 above by performing the following tasks:

2.5.1 The size of each triangle must be 150. (2)

2.5.2 Each new triangle must be rotated at an angle of 45 degrees. (2)

2.5.3 There must be 8 triangles in total. You can make use of loops to draw the shape. (7)

2.6 Print your program code from the IDE. (1)

2.7 Make a screenshot of your shape and paste it into MS Word. Include the heading QUESTION 2 and your EXAMINATION NUMBER. Print out your document. (1)

SAVE your program as: Question2_EXAMINATION_NUMBER.py using your EXAMINATION NUMBER.

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QUESTION 3

Mr Cele is the finance manager at a car sales company called BEST CAR DEALS which has multiple branches around the country. Mr Cele has approached you to write a Python program to analyse the car sales for the Toyota brand for the month of May 2024.
The program will utilise the May 2024 sales data for 5 Toyota brands sold by the company.

The program must have the following functionality:

- Store the sales data for the five Toyota brands which contains the model name, price and quantity sold for May 2024.
- Display a suitable Header for the report along with the sales data.
- Calculate and display the total monthly sales for the model.
- Calculate and display the monthly profit made for the model.

The company uses the following profit percentage table based on the selling price:

Table 3.1 – Table showing criteria for Profit percentage rate

Profit Percentage	Vehicle selling price
40% profit	Selling price greater than R700 000
30% profit	Selling price greater than R500 000
20% profit	Selling price less than and equal to R500 000

- The program must also Calculate and display the following:
  - Total number of vehicles sold for the month for all models.
  - Average number of vehicles sold for the month for all models.
  - Lowest number of vehicles sold for the month for any model.
  - Highest number of vehicles sold for the month for any model.

Formula guide:

The Total Monthly Sales is calculated as follows:

Total Monthly Sales = qty sold * vehicle price

The Monthly Profit is calculated as follows:

Monthly Profit = Total Monthly Sales * profit percentage

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The FIGURES 3.1–3.3 below demonstrate what the user interface looks like with sample output.

```
May 2024 Sales Analysis of Toyota vehicles

Vehicle Model   Vehicle Price      QTY Sold     Total Sales  Monthly Profit
Fortuner        R800000.00              763     R610400000.00     R244160000.(
 Corolla        R400000.00             1543     R617200000.00     R123440000.(
   Hilux        R600000.00             2367    R1420200000.00     R426060000.(
 Starlet         R30000.00             1047      R31410000.00       R6282000.(
   HiAce        R700000.00              417     R291900000.00      R87570000.(

Total number of Toyota vehicles sold for the month:  6137
Average number of Toyota vehicles sold across the models: 1227
Lowest number Toyota vehicles sold for any model:  417
Highest number Toyota vehicles sold for any model:  2367
```

FIGURE 3.1 – DEMONSTRATING THE CAR SALES USER INTERFACE

```
May 2024 Sales Analysis of Toyota vehicles

Vehicle Model   Vehicle Price      QTY Sold     Total Sales  Monthly Profit
Fortuner        R800000.00              763     R610400000.00     R244160000.(
 Corolla        R400000.00             1543     R617200000.00     R123440000.(
   Hilux        R600000.00             2367    R1420200000.00     R426060000.(
 Starlet         R30000.00             1047      R31410000.00       R6282000.(
   HiAce        R700000.00              417     R291900000.00      R87570000.(
```

FIGURE 3.2 – DEMONSTRATING THE TABLE PORTION OF THE REPORT

```
Total number of Toyota vehicles sold for the month:  6137
Average number of Toyota vehicles sold across the models: 1227
Lowest number Toyota vehicles sold for any model:  417
Highest number Toyota vehicles sold for any model:  2367
```

FIGURE 3.3 – DEMONSTRATING THE ANALYSIS PORTION OF THE REPORT

Create your program as: Question3_EXAMINATION_NUMBER.py using your EXAMINATION NUMBER.

ADD your EXAMINATION NUMBER as a comment to the first line of the program.

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3.1 Declare three global lists, one list for each of the vehicle details. Initialise each of the three lists with the values provided in the table below:

Name of list	Values for the list
model	'Fortuner', 'Corolla', 'Hilux', 'Starlet','HiAce'
price	800000.00,400000.00, 600000.00, 30000.00, 700000.00
qty	763,1543,2367,1047,417

(6)

3.2 Create a non-parameter function called Display_Menu():

The function must display the values stored in each of the three lists in a table format. The table should have a title and a header row, refer to FIGURE 3.2.

Add the following program code to the function: (2)

3.2.1 Declare variables needed for the function. (2)

3.2.2 Display a title for the sales report. (1)

3.2.3 Display a Header for the table with three columns for the Vehicle Model, Vehicle Price, QTY Sold, Total Sales, and Monthly Profit. Format the columns to have the appropriate spacing. (2)

Display the sales report details in a table format with values from each of the three lists. *(It is important to remember that the columns should have the appropriate spacing to represent a table.)*

3.2.4 Use a *For loop* to traverse each element in the list. The loop will access the sales report data for each Toyota model. (4)

3.2.5 Determine the profit percentage for the vehicle model which is based on the vehicle's selling price.
(Refer to table 3.1 to guide you for the profit percentage rates) (5)

3.2.6 Calculate the total sales and profit for the vehicle model the profit percentage which is based on the vehicle's selling price.
(Refer to the formula guide to assist you with the calculations. (4)

3.2.7 Display the sales report details in a table format

- The table should have FIVE rows of values corresponding to the THREE lists.
- Each row should have FIVE columns.
- The first THREE columns will represent values from the THREE lists.
- The FOURTH and FIFTH columns must be calculated.
- The FOURTH represents the value for Total Sales.
- The FIFTH column represents the value for Monthly Profit.
- Format the columns to have the appropriate spacing.
- Format the prices to display as currency.

(Refer to FIGURE 3.2 to guide you) (7)

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3.3 Create a non-parameter function called AnalyseSales():

The function must calculate and display the analysis of the sales data.
You can use the built-in Python functions to perform the calculations.
(Refer to FIGURE 3.3 to guide you)

Add the following program code to the function: (2)

3.3.1 Declare variables needed for the function. (2)

3.3.2 Analyse the data and calculate the following:

- Total number of vehicles sold for the month for all models.
- Average number of vehicles sold for the month for all models.
- Lowest number of vehicles sold for the month for any model.
- Highest number of vehicles sold for the month for any model.

(You can use the built-in Python functions to perform the calculations) (5)

3.3.3 Display the calculations for QUESTION 3.3.2 with a suitable message. (4)
(Refer to FIGURE 3.3 to guide you)

In the main module add the following functionality.

3.4 Call the functions **Display_Menu()** and **AnalyseSales()**. (2)

3.5 Test your program, make a screenshot of your output and paste it into MS Word. Include the heading QUESTION 3 and your Examination Number. Print out your document. (1)

3.6 Make a Printout of the source code.
Ensure that the line numbers are printed as well. (1)

SAVE your program as: Question3_EXAMINATION_NUMBER.py using your examination number.

Ensure that you added your EXAMINATION NUMBER as a comment to the first line of the program.

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TOTAL: 100

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