



UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

PAPER CODE TDIT 125	PROGRAMME NATIONAL DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY YEAR I SEMESTER II	DATE MONDAY, 15 TH AUGUST 2022
SERIES JULY/AUGUST 2022	PAPER NAME INTRODUCTION TO PROGRAMMING WITH VISUAL BASIC	TIME ALLOWED 3 HOURS
YOU SHOULD HAVE THE FOLLOWING FOR THIS EXAMINATION Computer with Visual Basic Software installed Compact Disc (CD) Printer and Printing papers		

INSTRUCTIONS TO CANDIDATES

1. *This paper consists of **six** practical questions.*
2. *Answer only **four** questions.*
3. *All questions carry equal marks.*
4. *Open a folder on the desktop with your name and registration number where all the practical work shall be saved.*
5. *Transfer all your files and projects to the compact disc (CD) and print the hard copies of outputs and codes.*
6. ***Do not** write anywhere on this question paper.*

Question One

Calculators are very important in our daily life. They are helpful while making calculations in any domain. Calculators vary based on their functionalities. For example, a standard calculator has some functions that it cannot handle unlike a scientific calculator. However, in this case, we will be dealing with a scientific calculator. On the calculator, the following should be ensured.

Additional Information:

1. *Sin* is the function that computes the value of the sine of an angle in radians.
2. *Cos* is the function that computes the value of the cosine of an angle in radians.
3. *Tan* is the function that computes the value of the tangent of an angle in radians.
4. *Log* computes the value of the logarithm to base 10 whilst *ln* computes the value of natural logarithm.

Figure 1: Calculator

7	8	9	+	Sqr	Sin
4	5	6	-	M	Cos
1	2	3	x	MR	Tan
0	.	=	÷	MC	Log
%	C	CE	+/-	M+	Ln

Required:

- (a) Design the above calculator interface using the relevant Visual Basic controls. (10 marks)
- (b) Write Visual Basic codes to visualize the button functionalities. (12 marks)
- (c) Print the interface design and the codes. (03 marks)

Question Two

Quadratic equation is a fairly straight forward high school mathematics problem. The quadratic equation solver is programmed to determine the number of roots the equation has as well as to compute the roots. It uses the determinant $b^2 - 4ac$ to solve the problems.

If $b^2 - 4ac > 0$, then it has two roots and if $b^2 - 4ac = 0$, then it has one root, else it has no root. To obtain the roots, the program uses the standard quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Required:

- (a) Design a Visual Basic interface that will help a user input the coefficients of the equation to compute its roots and determine the number of roots. (10 marks)
- (b) Write a Visual Basic code to implement the computation of the roots of the equation. (12 marks)
- (c) Print the interface design and the codes of the project. (03 marks)

Question Three

Currently, people seem to face a lot of difficulties to secure a loan or have a problem to pay back the loan. Still, we need to borrow money every now and then to acquire an asset or to pay for education fees. So, naturally we need to find out how long we can settle a loan for a certain amount of monthly payment at a certain interest rate. It is not easy to calculate such figures, fortunately Visual Basic comes to the rescue. There is a built-in function in Visual Basic to calculate the payback period. It is known as **Nper** and the syntax is **Nper (Rate, Pmt, Pv, Fv, Due)** where;

- **Rate**=Interest Rate
- **Pmt**=Amount of Periodic Payment
- **PV**=Loan taken
- **FV**=Future Value (set to 0 if loan is settled)
- **Due**=Set to 1 if payment at the beginning of the period, set to 0 if payment at the end of

the period since $payback = \frac{\text{loan}}{\text{monthly payment}} \times 100\%$

Required:

- (a) Design a Visual Basic user interface design that will be used to compute the payback of the UGx84000 given that the interest rate is 4% and monthly payment of UGx445. (10 marks)
- (b) Write the code to implement the above computation. (12 marks)
- (c) Print the interface and codes. (03 marks)

Question Four

You are provided with a screenshot of a multimedia player that follows the steps described below;

Step 1: User chooses the type of files he wants to play.

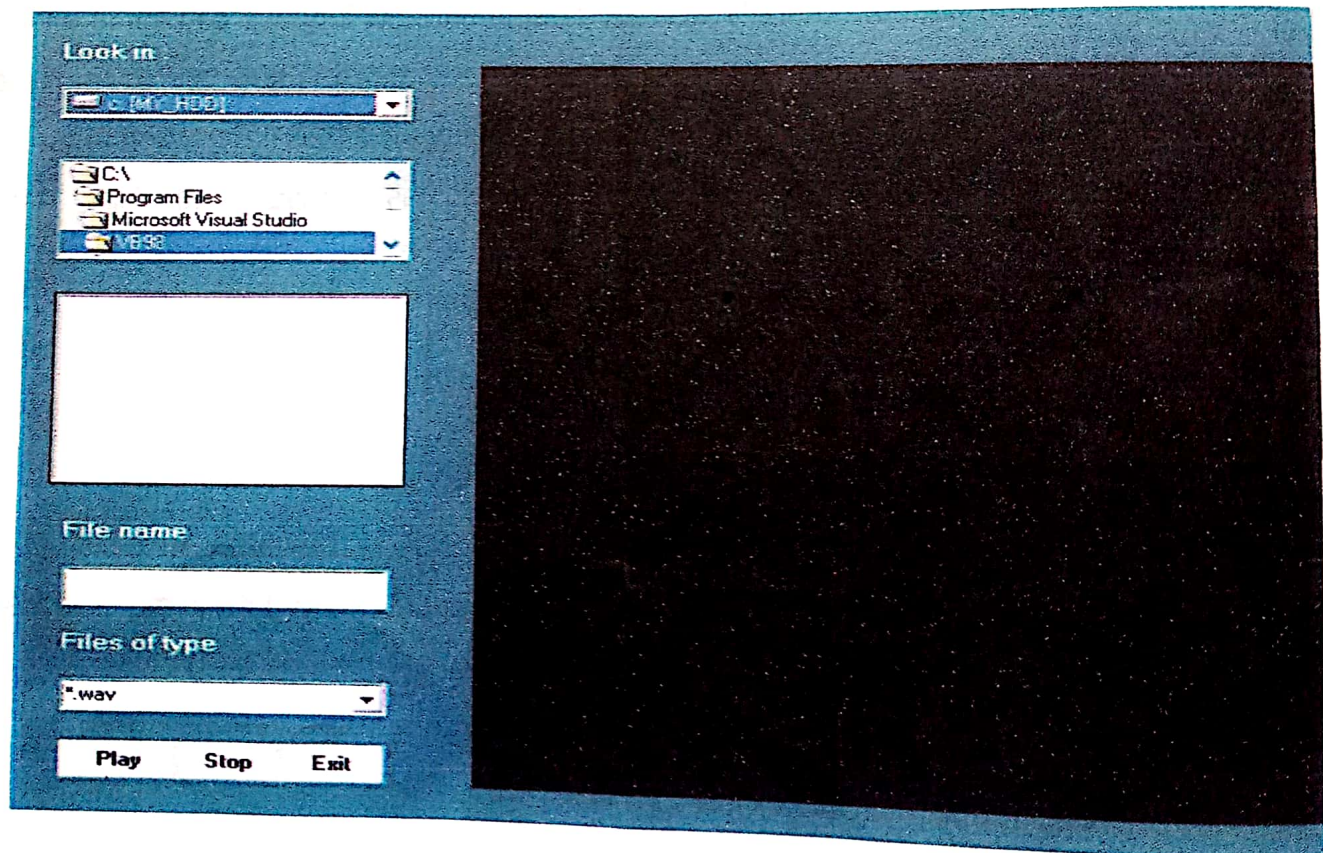
Step 2: User selects the drive that might contain the relevant audio files.

Step 3: User looks into directories and subdirectories for the files specified in step 1. The files should be displayed in the **FileListBox**.

Step 4: User selects the files from the **FileListBox** and clicks the **Play** button.

Step 5: User clicks on the **Stop** button to stop playing and Exit button to end the application.

Figure 2: Multimedia Player



Required:

- (a) Redesign the user interface above using the relevant control tools and properties. (10 marks)
- (b) Write a Visual Basic code to implement the multimedia project designed in 4(a). (12 marks)
- (c) Print the interface design and the codes of the project. (03 marks)

Question Five

A program should test whether a number entered by the user is a prime number or not. A prime number is a number that cannot be divided by other numbers other than by itself without having a remainder. Examples are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37 and more. For case 1, all numbers that are less than 2 are prime numbers. In case 2, if the number is 2, it is a prime number. In the last case, if the number N is more than 2, we need to divide this number by all the numbers from 3, 4, 5, 6,.....up to N-1. If it can be divided by any of these numbers, it is not a prime number, otherwise it is a prime number.

Required:

- (a) Design a Visual Basic interface that will help a user input a number that will be checked whether it is a prime number or not a prime number. (10 marks)
- (b) Write a Visual Basic code to implement the above process. (12 marks)
- (c) Print the interface design and the codes of the project. (03 marks)

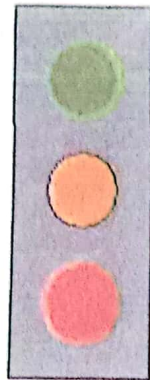
Question Six

A traffic light simulator works like the actual traffic lights. It can be programmed fairly easily. In this program, you have to insert one timer and set its interval to any figure. Here, we set it to 3000, which is equivalent to 3 seconds. Next, you insert three shapes and set their shape properties to circle and fill them with three colors, green, amber (or yellow) and red.

Required:

- (a) Design a Visual Basic interface using the required Visual Basic controls that will visualize the interface below. (10 marks)

Figure 3: Traffic light



- (b) Write a Visual Basic code to implement the above process.
- (c) Print the interface design and the codes of the project.

(12 marks)

(03 marks)

END