Aga Khan University Examination Board

Notes from E-Marking Centre on SSC II Computer Science Examination May 2016

Introduction

This document has been produced for the teachers and candidates of SSC II (Class X) Computer Science. It contains comments on candidates' responses to the 2016 Secondary School Certificate (SSC-II) Examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

E-Marking Notes

This includes overall comments on candidates' performance on every question and *some* specific examples of candidates' responses which support the mentioned comments. Please note that the descriptive comments represent an overall perception of the better and weaker responses as gathered from the e-marking session. However, the candidates' responses shared in this document represent some specific example(s) of the mentioned comments.

Teachers and candidates should be aware that examiners may ask questions that address the Student Learning Outcomes (SLOs) in a manner that requires candidates to respond by integrating knowledge, understanding and application skills they have developed during the course of study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfill the demand of the question.

Candidates need to be aware that the marks allocated to the questions are related to the answer space provided on the examination paper as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Candidates need to be familiar with the command words in the Student Learning Outcomes which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Words such as 'how', 'why' or 'what' may also be used.

Detailed Comments:

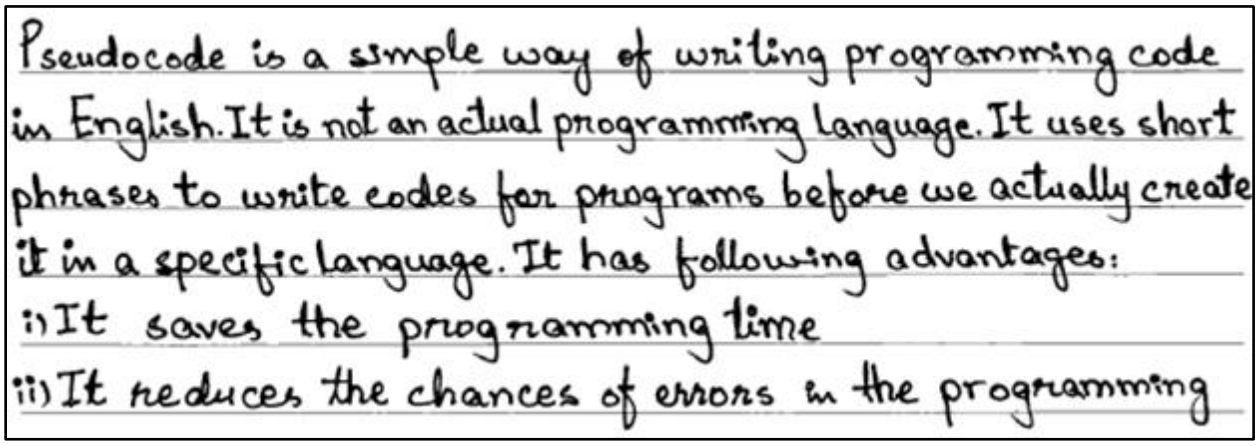
Constructed Response Questions (CRQs)

Question 1a

Define the term pseudocode. Write TWO advantages of using pseudocode before writing a computer program.

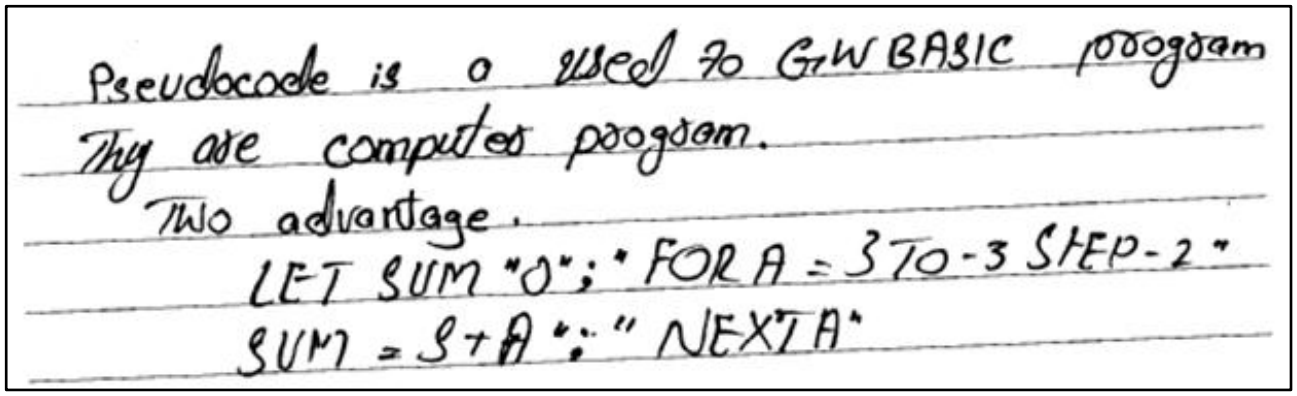
Better responses defined the term pseudocode as a false code which could not be compiled by any machine/ a step-by-step solution to a problem which contains plain English statements, mathematical notations and some keywords/ pseudocode is one of the types of algorithm to write down basic logic of the an actual program.
Moreover, such responses stated advantages of pseudocode including, no need to compile or execute a pseudocode/ less chances of error in the actual program/ no need to obey syntax rules/ a clear and simple illustration of the programming steps and logic/ no computer language is required to write pseudocode/ it helps to focus on program logic rather than focusing on the syntactical descriptions of a specific programming language.

Example:


Pseudocode is a simple way of writing programming code in English. It is not an actual programming language. It uses short phrases to write codes for programs before we actually create it in a specific language. It has following advantages:
i) It saves the programming time
ii) It reduces the chances of errors in the programming

Weaker responses were unable to define pseudocode correctly and most of the responses stated pseudocode as programming code. These responses mentioned that pseudocode is a computer program/ GWBASIC program or it is input given to computer program by user to process. These responses also stated the inappropriate advantages of pseudocode and most of the advantages were written for programming languages/ GW BASIC instead of pseudocode.

Example:



Question 1b

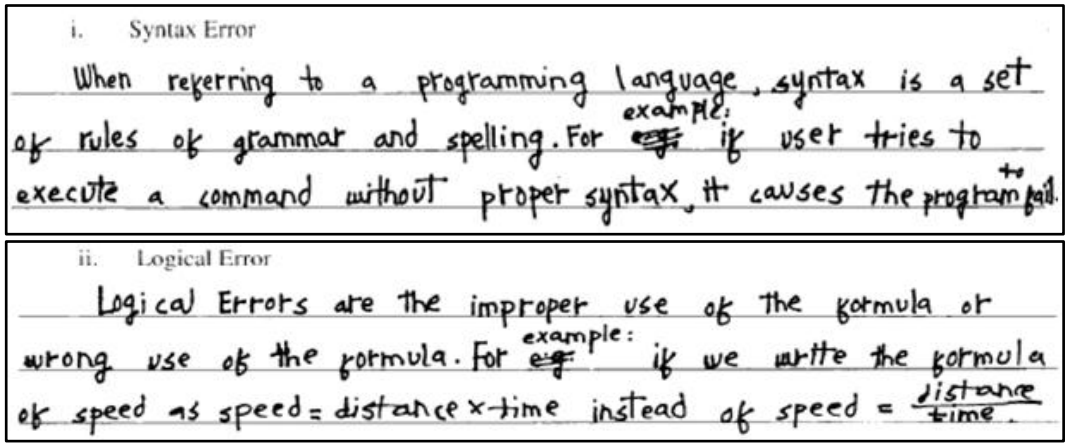
Define the given types of computer error.

1. Syntax Error
2. Logical Error

Better responses correctly defined syntax error as an error instigated due to the wrong use of the programming language which includes incorrect punctuation, word sequence, undefined terms or misuse of terms/ a language processor detects it when compiling the programming code/ this is due to grammatical error in the programming statements or keywords/ these errors are detected during compiling/ if there is syntax error, program will not execute or run.

Also, these responses defined a logical error as it is an error triggered due to the improper use of the formula or use of incorrect symbols/ it is an error in logical organisation of program which includes wrong mathematical operation, wrong formula, wrong input or wrong process/ a compiler cannot detect this error/ this error does not allow to get desired/intended results when program is executed.

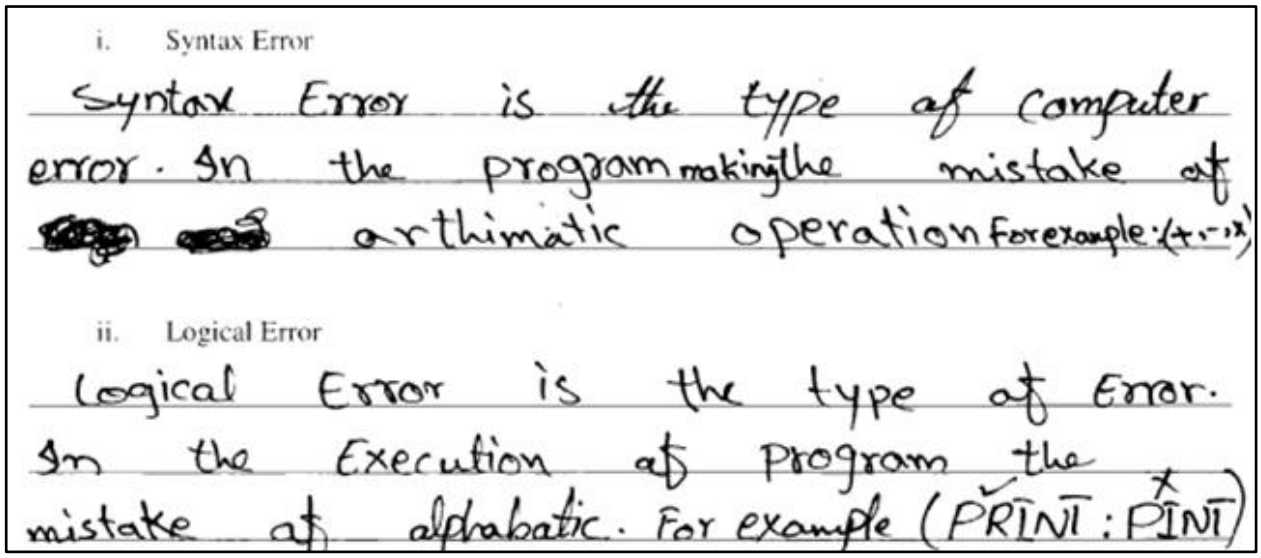
Example:



Weaker responses defined syntax error as this error which occurs due to mathematical or sign error/ error of function used/ error when programmer adds wrong variable or wrong formula/ error not possible to solve or type of computer error.

Furthermore, these responses defined logic error as this error that occurs when programmer writes unknown commands and variable/ error in logical expression/ error found in sentence or spelling mistake/ error in execution of program/ error due to mistake of alphabet.

Example:



Question 2a

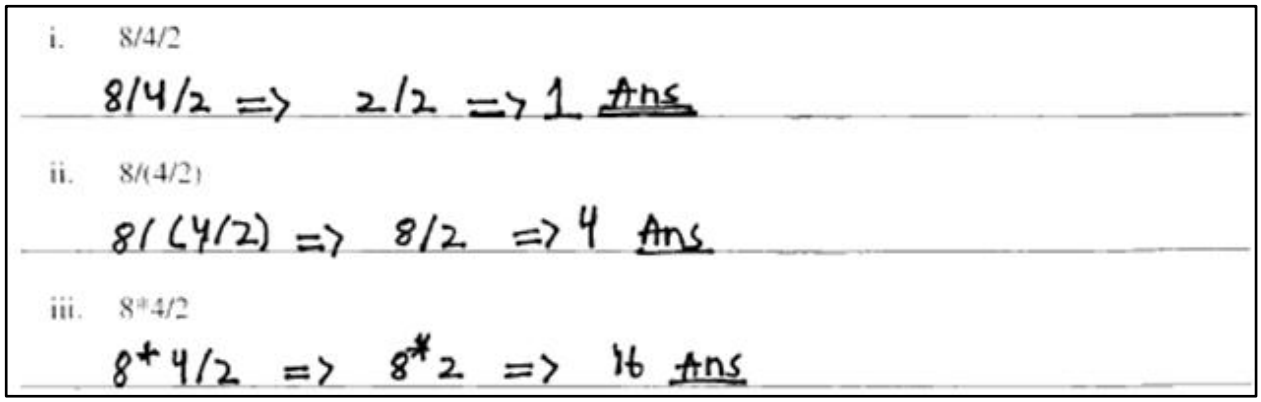
Write the value of the given GW BASIC expressions.

i. 8/4/2
ii. 8/(4/2)
iii. 8*4/2

Better responses solved the GW BASIC expression by using the BODMAS (Bracket, Order, Division, Multiplication, Addition, Subtraction) rule that describes the order of operations as shown below.

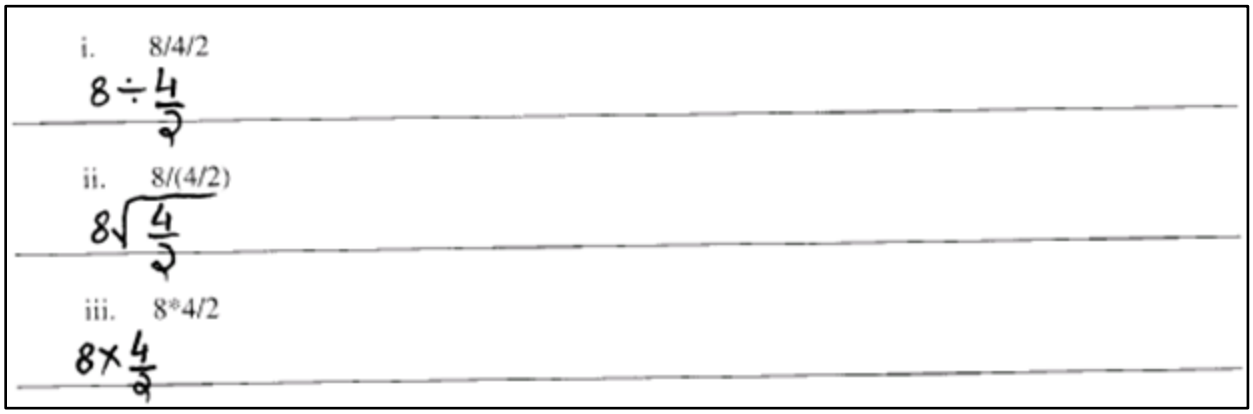
i. 8/4/2 => 2/2 => 1
ii. 8/(4/2) => 8/2 => 4
iii. 8*4/2 => 32/2 => 16

Example:



Weaker responses applied wrong order of operations to solve the given GW BASIC expressions. Likewise, these responses converted GW BASIC expression into plain mathematical expression.

Example:



Question 2b

State the function of the following statements of GW BASIC.

i. Left$
ii. On Error Goto

Better responses stated the correct function of Left$, i.e. it is used to select or extract the left most **n** characters or substring of a word or given string. Similarly, these responses stated that On Error Goto is an error trapping statement/ error capturing statement/ it transfers the control to the mentioned line number when error is detected.

Example:

Statement	Function
Left$	It is used to select left most 'n' characters from a given string.
On Error Goto	It is used for error trapping during program execution.

Weaker responses stated the incorrect function of Left$, i.e. it is used for conditional statement/ it lefts the program and switches to another program/ prints from left to right according to prescribed order/ starts the program from the left side. Moreover, these responses stated that ON ERROR GOTO is a multiple branching statement, used to check error on ON GOTO statement or locate line in which error occurs and then stops the program to show the error.

Example:

Statement	Function
Left$	left$ prints from left to right according to the prescribed order.
On Error Goto	on Error Goto locate the line in which their is error.

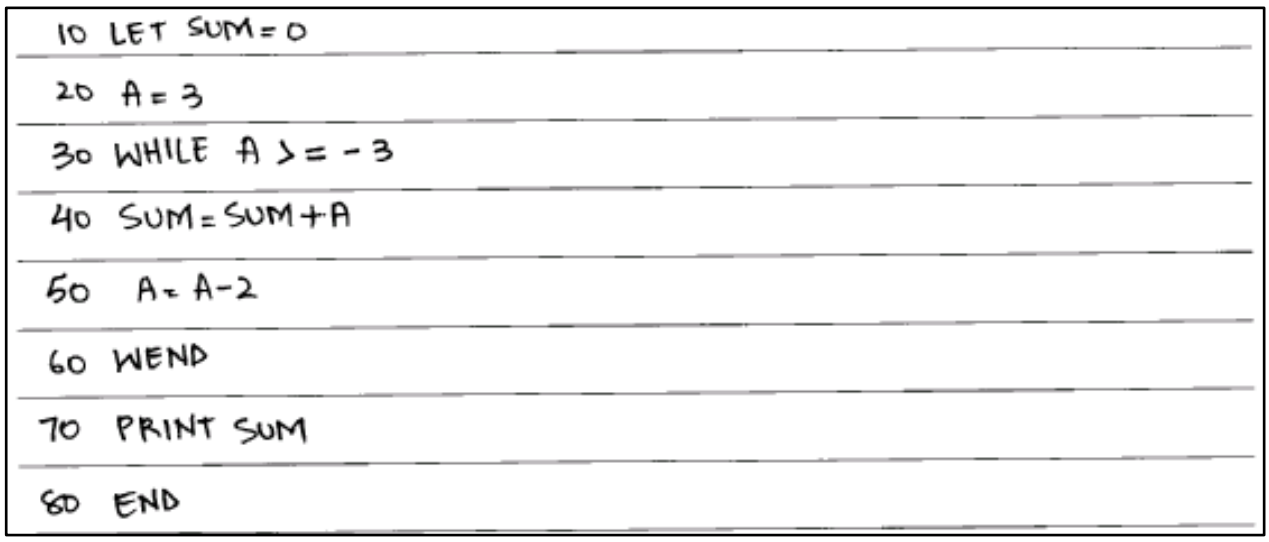
Question 3

a. Convert FOR NEXT loop into WHILE WEND loop in the given program.
b. Write the output of the program written in part a.

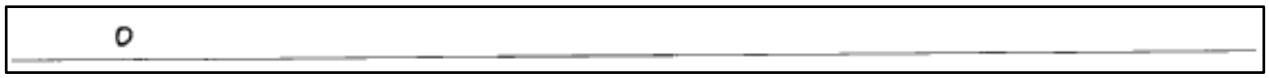
```
10 LET SUM = 0
20 FOR A = 3 TO -3 STEP -2
30 SUM = SUM + A
40 NEXT A
50 PRINT SUM
```

Better responses did proper initialisation of variable A in the start of program and used appropriate syntax of WHILE WEND keyword along with accurate WHILE loop condition. Moreover, such responses placed decrement statement (A = A − 2) at the required correct position.

Example (3a):

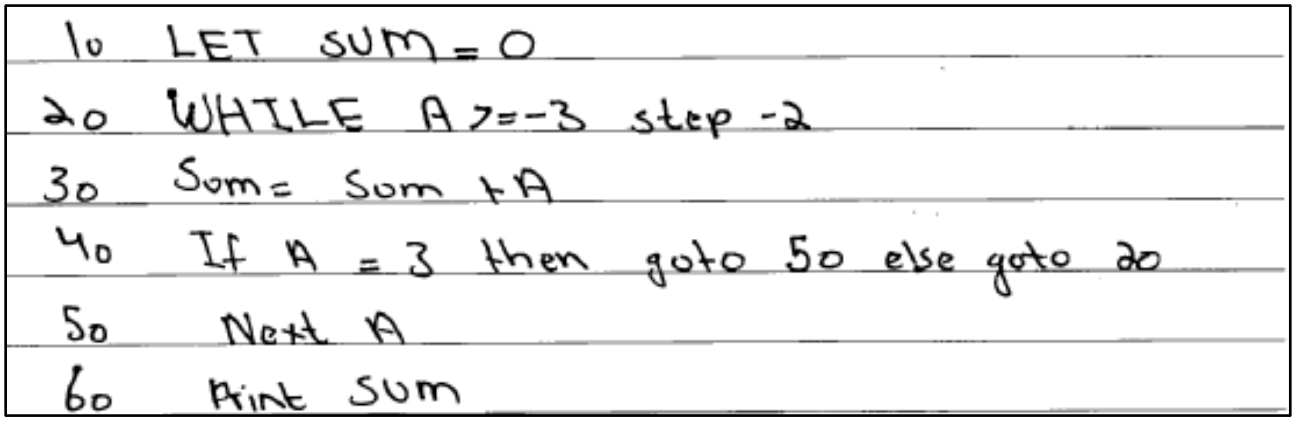


Example (3b):

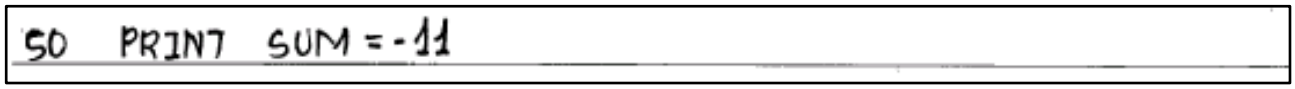


Weaker responses had common mistakes such as incorrect WHILE loop condition, i.e. incorrect starting value of counter variable in WHILE loop, no initialisation of variable A at the top of the program and wrongly placed decrement statement. For example, in most of the responses it is placed before totaling (Sum = Sum + A) statement. Candidates are strongly advised to only replace the loop statements with the type of loop specified in question rather than making changes in the rest of the code.

Example (3a):



Example (3b)



Question 4

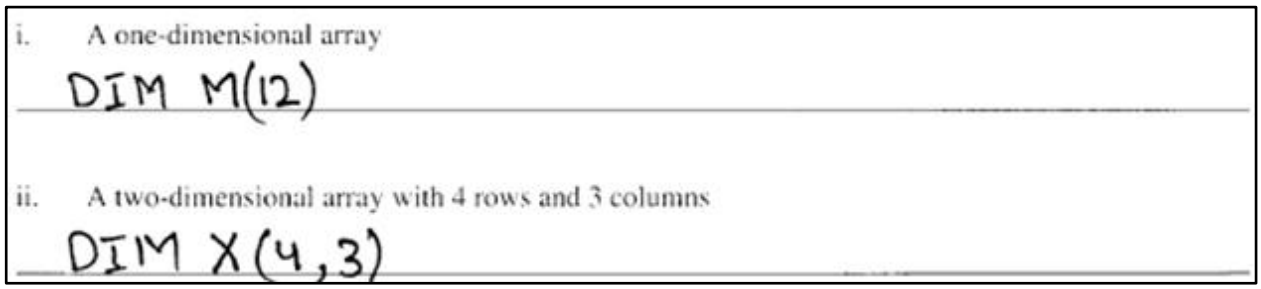
Consider the given marks in Computer Science of grade X students:
60, 55, 33, 22, 55, 70, 45, 59, 62, 58, 67, 57

Write syntax in GW BASIC to define

i. a one-dimensional array.
ii. a two-dimensional array with 4 rows and 3 columns.

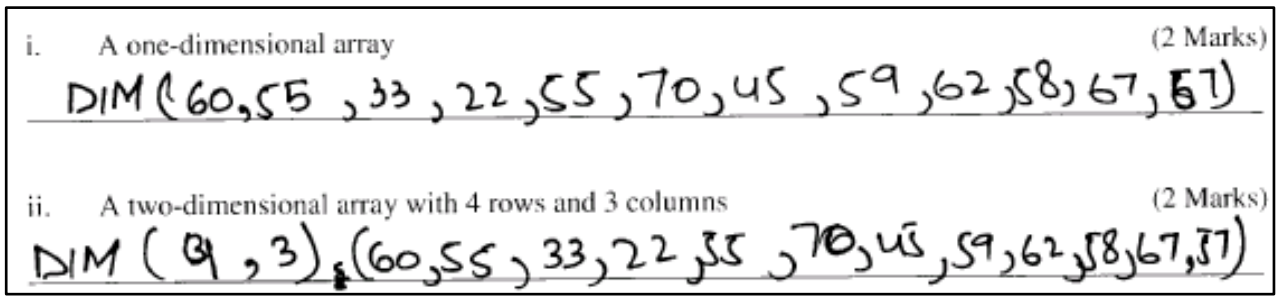
Better responses declared array with proper name, correct data type and size of array, i.e. array size is 12 for one-dimensional array and array size is 4 rows and 3 columns in case of two-dimensional array.

Example:



Weaker responses did not specify the correct data type, name and size of array. In most of these responses, name of array was not mentioned and instead of defining size of an array as 12, candidates wrote the 12 numbers randomly which is not correct.

Example:

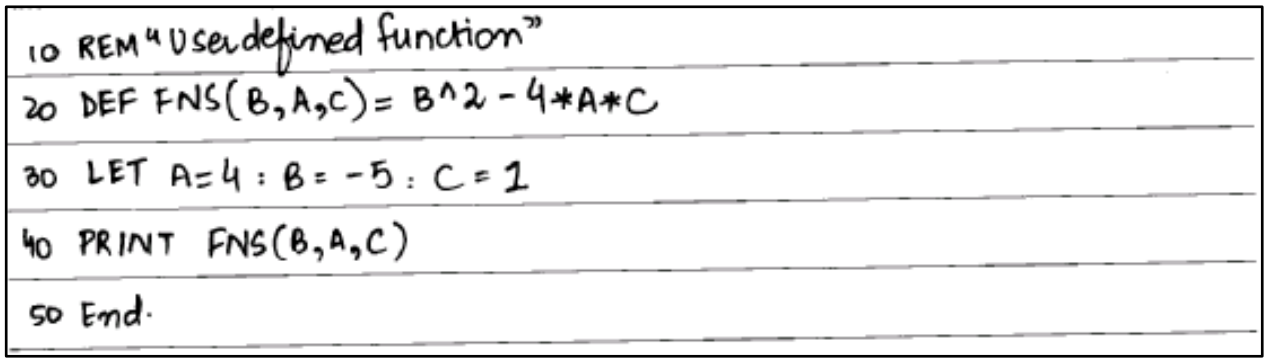


Question 5

Write a user defined function in GW BASIC to calculate the value of B2 – 4AC. Also print the value of the function for A=4, B=5 and C=1.

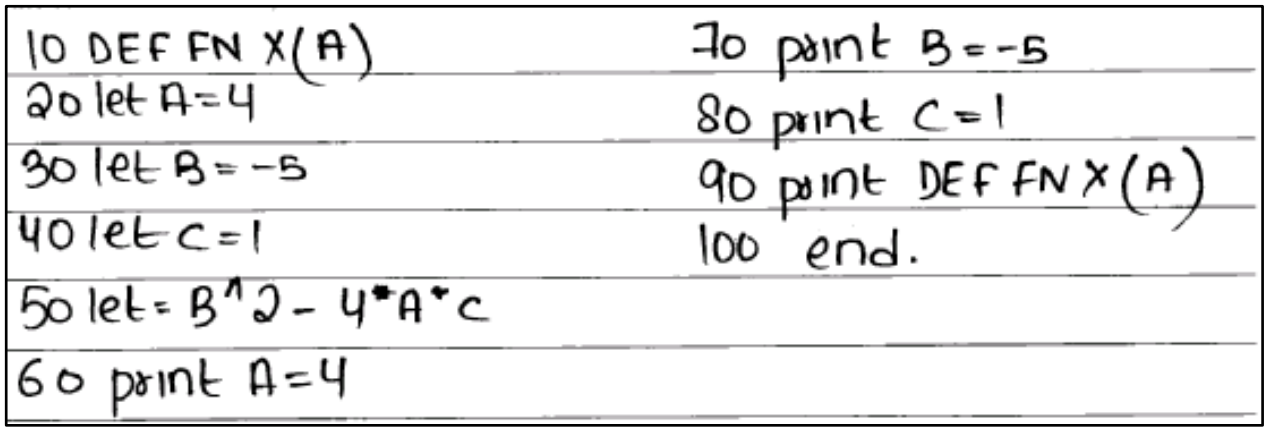
Better responses used the proper syntax to define function with appropriate number of function parameters. Furthermore, these responses transformed the equation in proper GW BASIC instruction and finally printed the values by calling the function with PRINT keyword.

Example:



Weaker responses were not able to define the function with proper DEF FNname and three parameters and instead of that, most of the responses used DEF keyword only. Likewise, these responses called the defined function incorrectly. However, one thing was common in most of these responses, i.e. mathematical expression was converted into GW BASIC expression correctly.

Example:

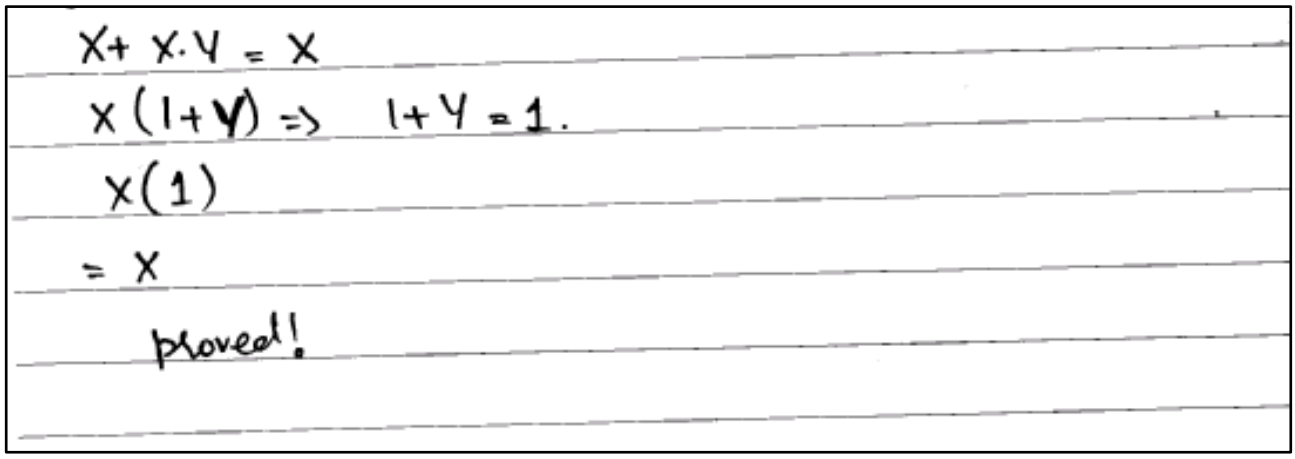


Question 6

Using Boolean algebra theorems, prove that X + X.Y = X

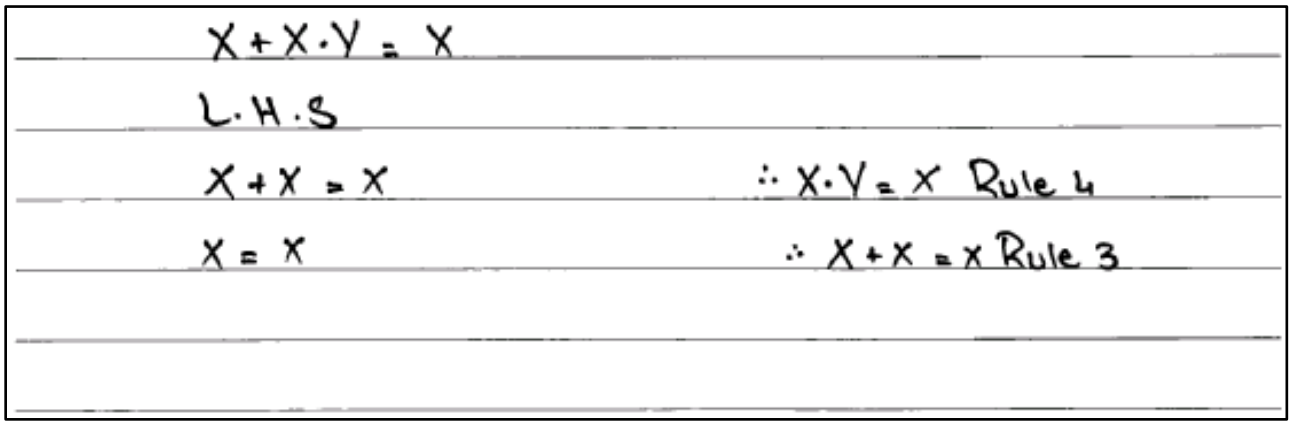
Better responses proved the identity by using correct Boolean algebraic theorems, i.e. 1+ Y = 1

Example:



Weaker responses were mostly neither able to take 'X' common from equation nor able to apply [1 + Y = 1] theorem to prove the given identity. Candidates are strongly advised to go through algebraic theorems in order to accurately prove such type of questions.

Example:



Extended Response Questions (ERQs)

The following questions offered a choice between part **a** and **b**.

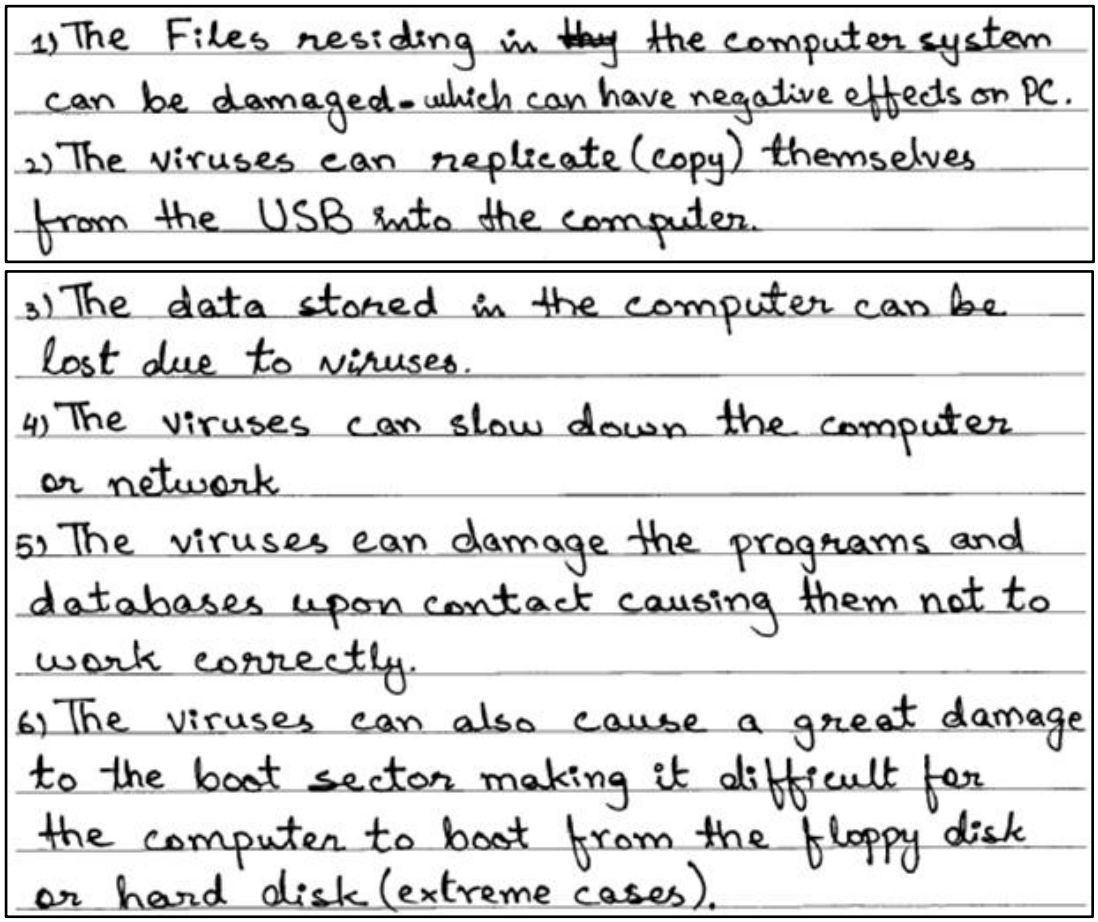
Question 7a

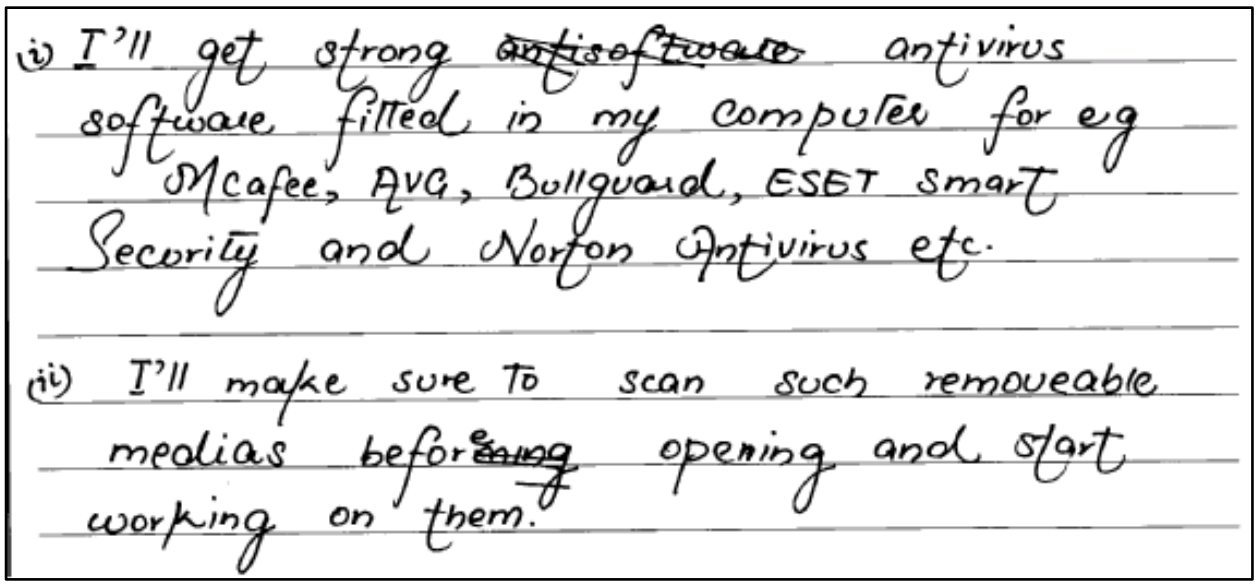
Suppose you connect a virus infected USB drive to your personal computer (PC).

i. Discuss at least SIX possible threats your PC is exposed to.
ii. What steps should you take to avoid the viruses from infecting your PC?

Better responses described threats such as a simple virus which can replicate itself quickly to occupy computing resources and halt the system. These responses also discussed about macro viruses, worm and a dangerous type of viruses which attacks both the boot sector and the executable files. Moreover, these responses stated the steps to protect against these viruses such as scan external storage devices (external hard disks or USB drives) before using them, install an anti-virus program and keep its virus definitions (database of virus information) up to date, run your anti-virus program regularly, do not double click to open the USB drive and open USB drive in new window by right click.

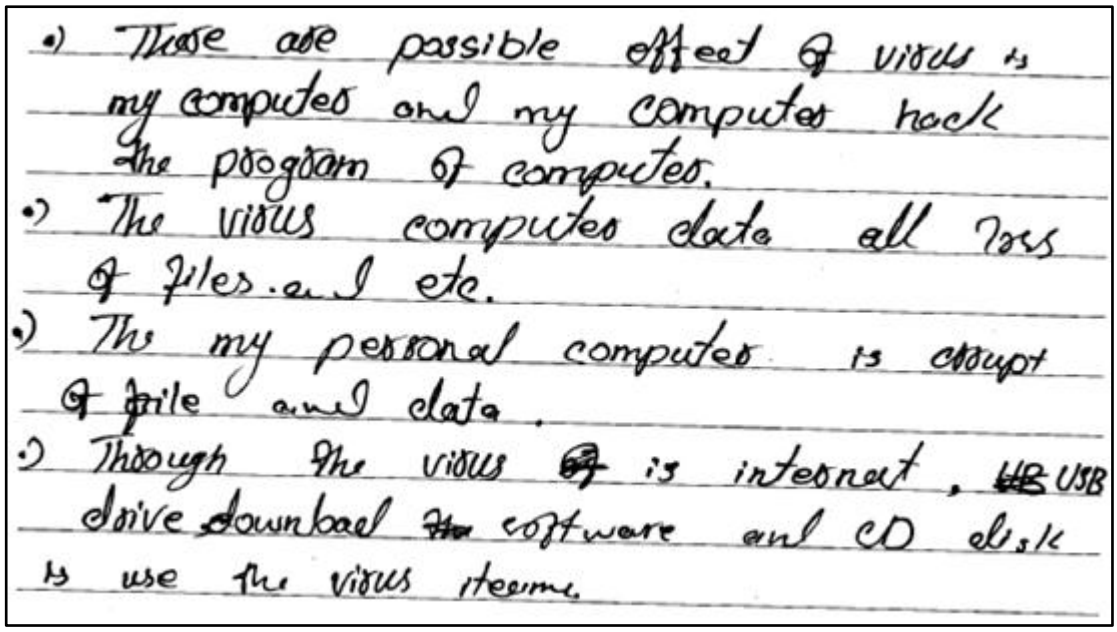
Example:





Weaker responses stated the online threats such as hacking, phishing, etc., instead of stating threats coming from a virus infected USB drive. Moreover, most of these responses stated what happens when we connect a USB drive with computer system. Some responses depicted confusion between steps to connect a USB drive and steps to avoid viruses infecting a computer system.

Example:



These steps should take when your computer spread the virus.

⇒ Download the antivirus software ~~in~~ computer

⇒ Make twin copies every things e.g files, works.

⇒ Download the news window when ~~the~~ your computer works.

i) The corrupt file windows software and DOS software and all program delete in Data program.

ii) The window not possible to steel the program of software and different type software and program etc.

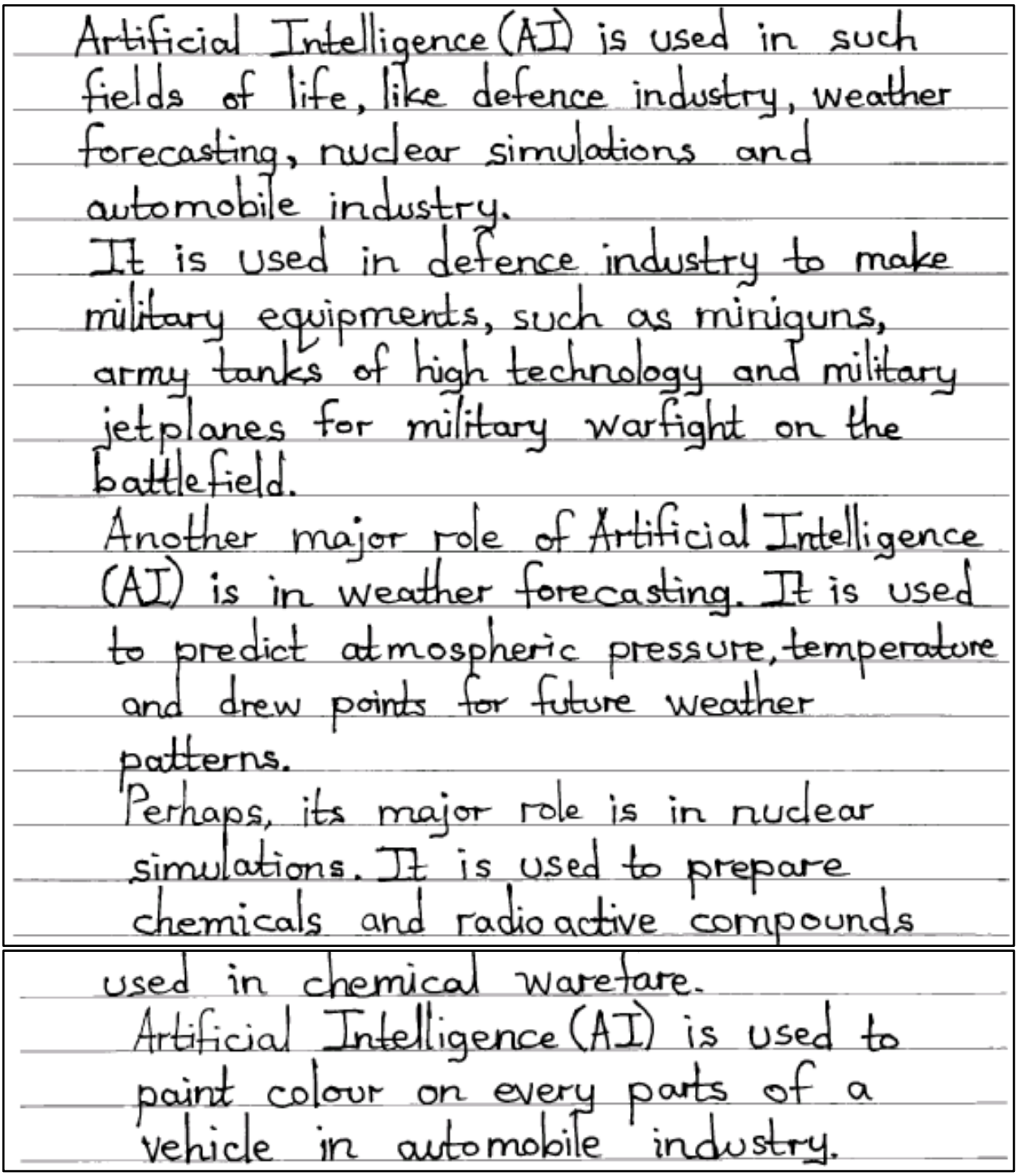
Question 7b

Artificial intelligence (AI) is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence.

Identify any FOUR fields of life where Artificial Intelligence (AI) is used. Also discuss ONE application of AI in each field.

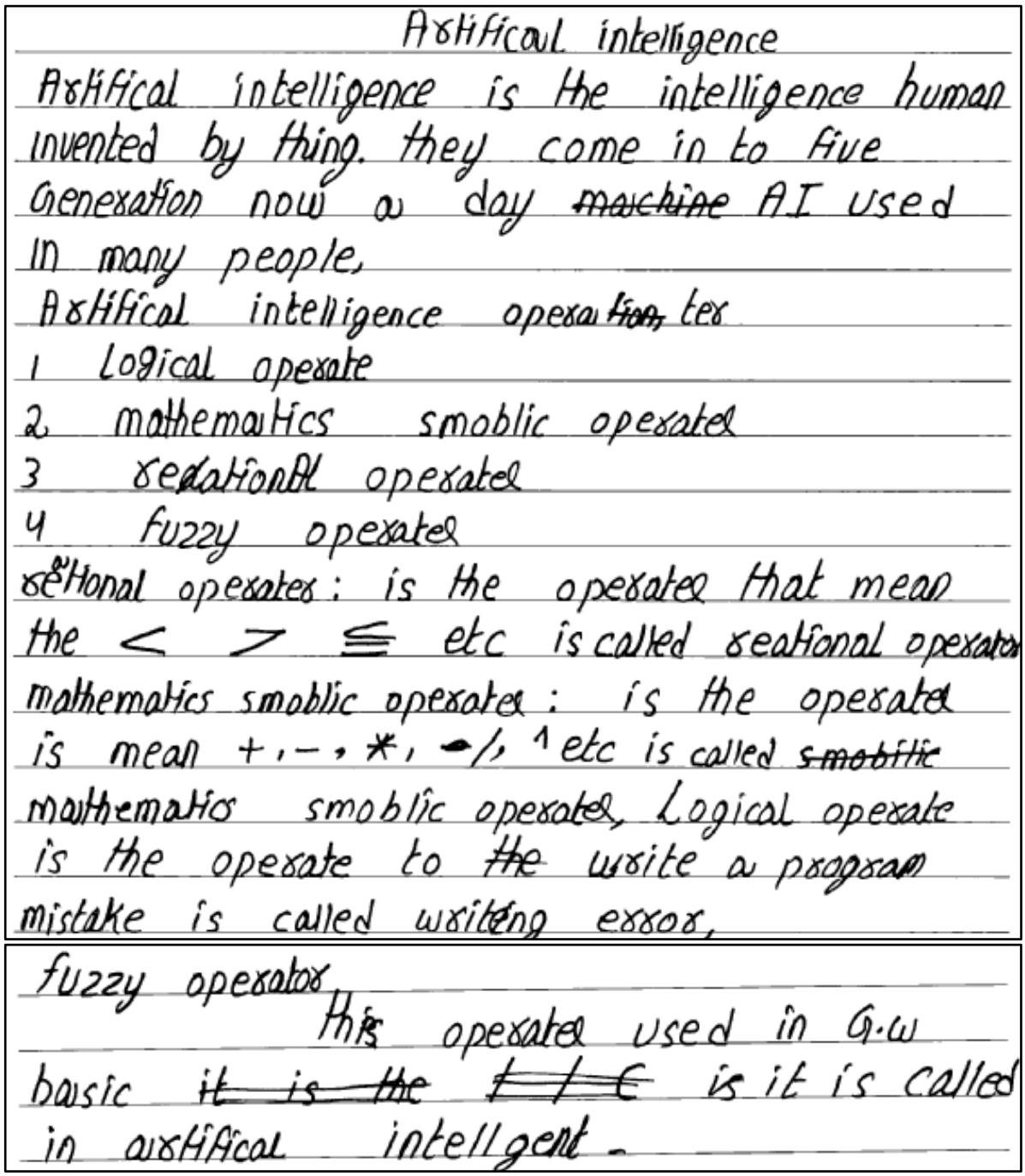
Better responses identified relevant fields of life where AI is used including weather forecasting, finance, defence & security, medical and transportation along with appropriate and more relevant applications for each field.

Example:


Artificial Intelligence (AI) is used in such fields of life, like defence industry, weather forecasting, nuclear simulations and automobile industry.
It is used in defence industry to make military equipments, such as miniguns, army tanks of high technology and military jetplanes for military warfight on the battlefield.
Another major role of Artificial Intelligence (AI) is in weather forecasting. It is used to predict atmospheric pressure, temperature and drew points for future weather patterns.
Perhaps, its major role is in nuclear simulations. It is used to prepare chemicals and radioactive compounds used in chemical warefare.
Artificial Intelligence (AI) is used to paint colour on every parts of a vehicle in automobile industry.

Weaker responses had mostly stated irrelevant fields. For instance, a response stated that AI is used in fuzzy operators, rational operator, logical operator and mathematics symbolic operators. Furthermore, most of these responses stated the same fields with different names (e.g. hospital, surgeries, and medicine) or stated the name of field correctly but could not describe the stated fields appropriately.

Example:



Artificaul intelligence

Artifical intelligence is the intelligence human invented by thing. they come in to five Genexation now a day ~~machine~~ AI used In many people,

Artifical intelligence operation tes

1 Logical opexate

2 mathematics smoblic opexated

3 xelationAl opexated

4 fuzzy opexated

xelHonal opexates: is the opexated that mean the < > ≦ etc is called xeational opexator mathematics smoblic opexates: is the opexated is mean +, −, *, ●/, ^ etc is called ~~smobitic~~ mathematics smoblic opexated, Logical opexate is the opexate to ~~the~~ write a program mistake is called writeing exxox,

fuzzy opexator,

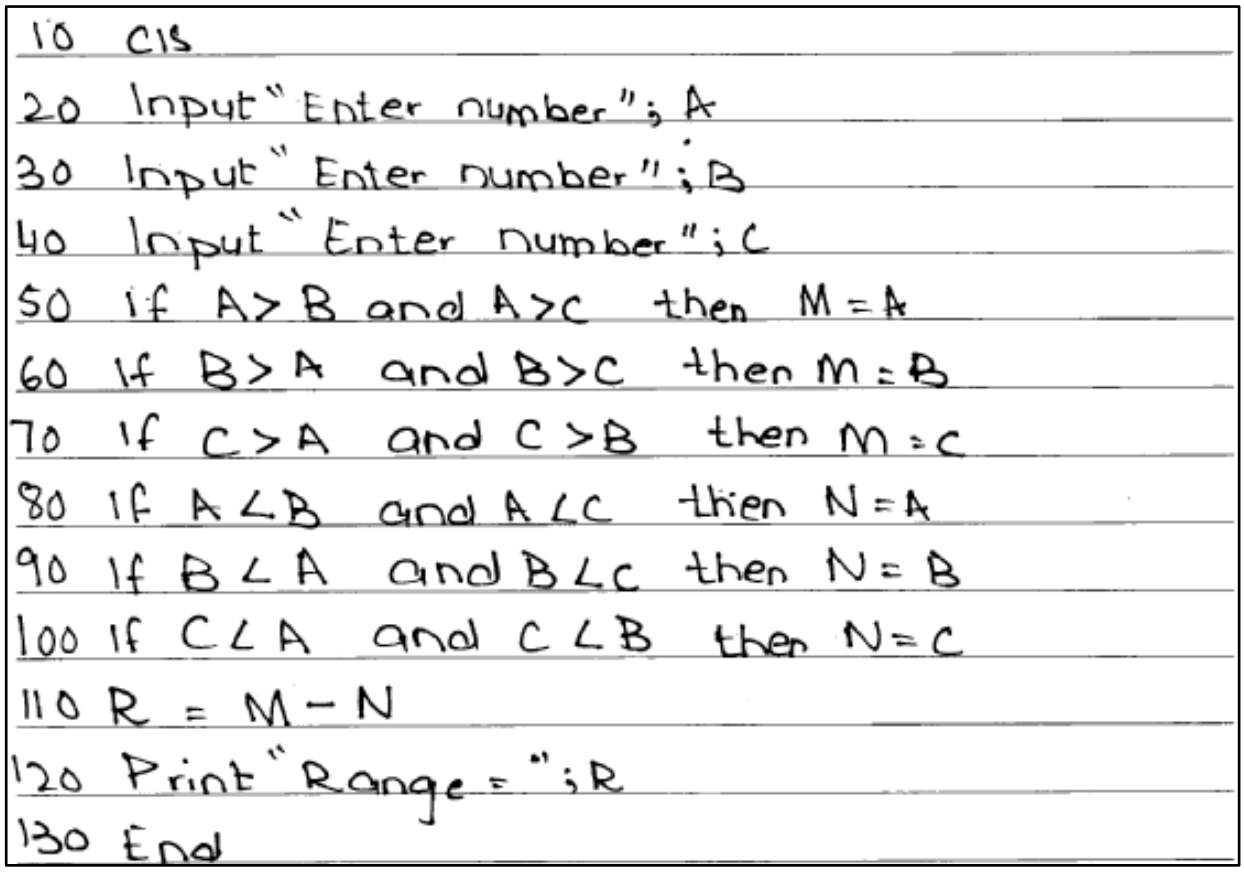
This opexated used in G.w basic ~~it is the~~ ~~t / €~~ is it is called in artifical intellgent.

Question 8a

Write a GW BASIC program to accept three numeric values from the user. Then find maximum and minimum values from them and print the range of these values, Where, Range = Max – Min

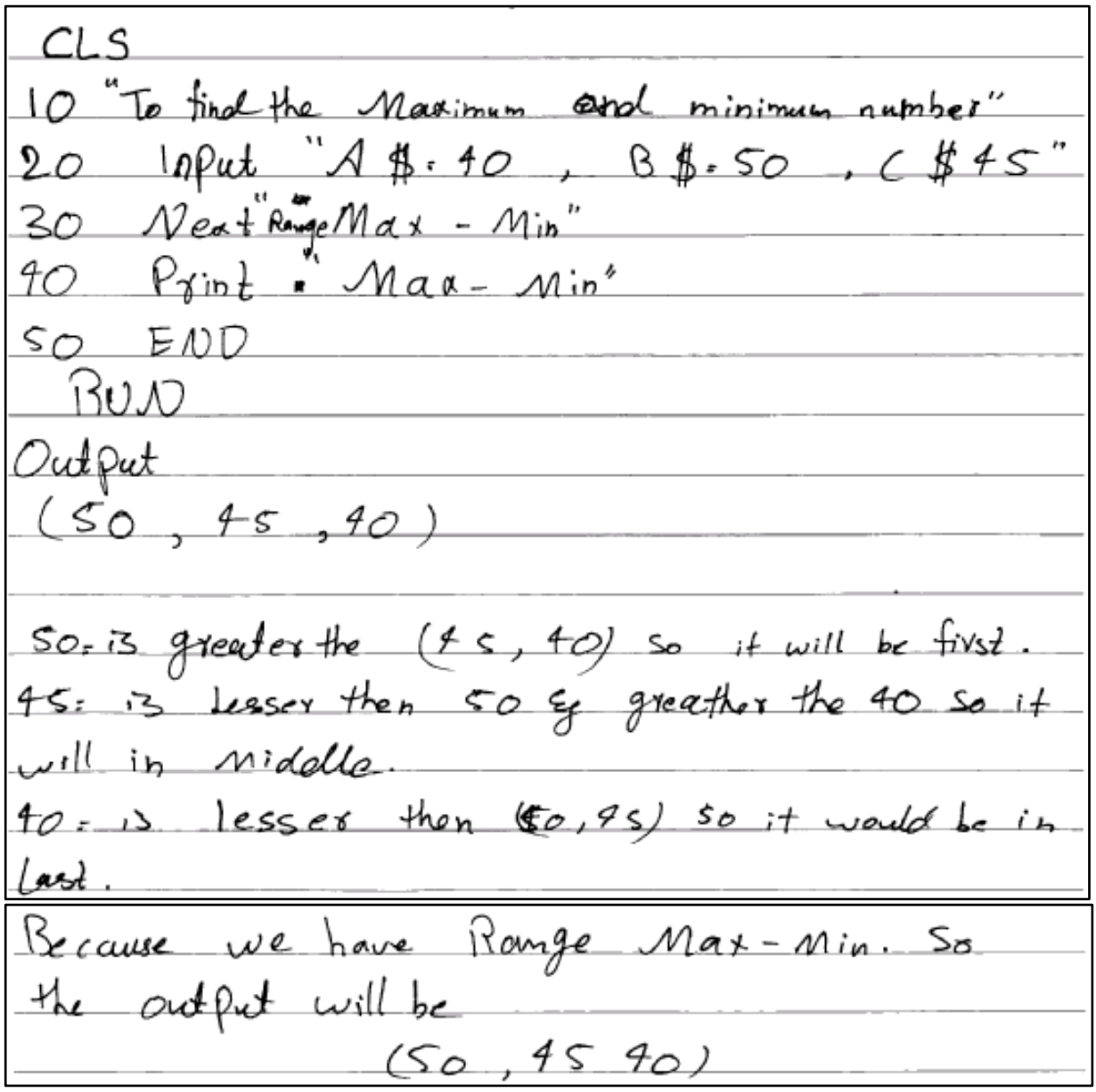
Better responses used correct input method for data, applied correct conditional and assignment statements and used appropriate expression for range and then printed the required fields. Likewise, few of these responses had also used arrays to solve the stated problem.

Example:



Weaker responses did not state proper GW BASIC statements and wrote plain English statements instead of programming statements. Also, most of these responses used incorrect conditional and assignment statements.

Example:



Question 8b

Write a GW BASIC program to calculate and print average of three different numbers. The program takes input from the user. The program also determines and prints the quantity of entered numbers which are above and below the average.

Sample Output
A = 9, B = 27, C = 12

The average of three values:	16
The number of values above the average:	1
The number of values below the average:	2

Better responses used proper GW BASIC statements to take input and calculate average. Furthermore, these responses used correct conditional statements and displayed output using appropriate PRINT instruction format.

Example:

```
10 CLS
20 Input "Enter first number" ; A
30 Input "Enter second number" ;B
40 Input " Enter third number" ; C
50 D = 0
60 F = 0
70 LET AVG = (A + B + C) / 3
80 If A > AVG Then D = D + 1 Else F = F + 1
90 If B > AVG Then D = D + 1 Else F = F + 1
100 If C > Avg AVG Then D = D + 1 Else F = F + 1
110 PRINT " The average of three numbers : " ; AVG
120 PRINT " The number of values above the area average average " ; D
130 PRINT " The number of values above the below the average " ; F
140 END
```

Weaker responses were not able to write proper syntax of GW BASIC statements and, instead of that, these responses had stated the plain English statements. Also, these responses were not able to use correct conditional statements or count numbers above and/or below the average.

Example: