UNIVERSITY OF GHANA

B.A/BSc. COMPUTER SCIENCE, FIRST SEMESTER UNIVERSITY

EXAMINATIONS: 2017/2018

CSIT105: PROGRAMMING FUNDAMENTALS (3 CREDITS)

INSTRUCTION:

The question paper consists of two sections, SECTION A and SECTION B.

In SECTION A, there are 60 multiple choice questions. Answer all. Provide your answer to each question by drawing a circle around one letter (a, b, c, d) of the options on the question paper.

In SECTION B, there are four questions. Answer any two. Write your answers in the booklet provided.

Submit both the question paper and the answer booklet.

TIME ALLOWED:

TWO AND HALF (2 ½) HOURS

SECTION A (60 MARKS)

In this section, answer All questions. Each question carries 1 mark.

A1. Problem solving through computer programming is strongly dictated by, which one?

a. The nature of the problem and the architecture of the computer system.

b. The programming methodology.

c. The programming paradigms.

d. The programming language.

A2. The design stage in program development framework is where….

a. system specification defines the problem domain.

b. understanding the problem and defining the method of solution is done.

c. developing the methods using suitable aids is done.

d. typing the instructions into the computer using a programming language is done.

A3. The analysis stage in program development framework is where….

a. system specification defines the problem domain.

b. understanding the problem and defining the method of solution is done.

c. developing the methods using suitable aids is done.

d. typing the instructions into the computer using a programming language is done.

A4. High level computer language compiler is …..

a. required at Layer 3 of the 7-layer Model.

b. required at Layer 4 of the 7-layer Model.

c. required at Layer 5 of the 7-layer Model.

d. required at Layer 6 of the 7-layer Model.

A5. The analysis and design of a specific problem determines ….

a. the type of logic to be used in solving the problem.

b. the paradigms to be deployed.

c. the computer language to be used .

d. All of the above

A6. Procedural languages use the ideas of structured data, recursion and user interactions to

a. Reduce machine dependency

b. Exploit parallel hardware

c. Increase the expressive power of 3rd generation computers

d. None of the above

A7. RISC machine is an example of ….

a. hardware that include sequential technology capability.

b. software that allows problems to be solved efficiently.

c. hardware that include parallel and distributed technology capabilities.

d. software that includes parallel and distributed technology.

A8. Which of the following is not a characteristic of 4GLs?

a. Exhibit strong instruction support.

b. Data are self-describing.

c. Exhibit strong data structure support.

d. Incorporate knowledge of the problem domain and of the user.

A9. Which one is a 5^{th} Generation language?

a. Assembly

b. Prolog

c. SQL

d. Visual BASIC

A10. The memory of John von Neumann machine is designed to contain …

a. both machine instructions and the pointers.

b. both machine instructions and data.

c. both data and the pointers.

d. machine instructions, data and pointers.

A11. A computer language which is a fully abstract machine and has fully hidden access and a utomatic allocation of memory.

a. Assembly

b. Prolog

c. SQL

d. Visual BASIC

A12. In lexical structure of programming languages, names chosen by the programmer to identify objects of interest are called …….

a. Operators

b. Keywords

c. Separators

d. Identifiers

A13. In program coding, layout play …..

a. An important role in the syntax of most programming languages.

b. A minor role in the syntax of most programming languages.

c. A major role in the compilation of the program.

d. None of the above.

A14. Context-free grammar describes …..

a. The syntactic structure of a programming language.

b. The semantics of a program.

c. The lexis of a programming language.

d. All of the above

A15. In EBNF rules the symbol | is read as …

a. OR

b. AND

c. Assigned

d. XOR

A16. A computer program may be defined as …..

a. A sequence of lexical symbols.

b. Sequence of machine instructions in memory.

c. In C++ , it is at least the main function and other functions.

d. All of the above

A17. Flow control of instructions in memory refers to …

a. The next machine instruction in memory.

b. Manipulation of the instructions

c. The series of successive values of Instruction Parsing

d. The series of successive values of Instruction Pointer

A18. What is the output of the following C++ code segment?

```
……..
int k = 3;
int j = 10;
int kount =17;
while(kount > j+k)
{
k +=2;
hot = j + k;
}
cout << “k =  “ << k  << “       “ << “hot = “ << hot << endl;
```

a. k = 3 hot = 13

b. k = 5 hot = 15

c. k = 7 hot = 17

d. k = 9 hot = 19

A19. Which of the following statements uses low-level mnemonics?

a. 23fc 0000 0001 0000 0040

b. (tt > tk) ? cout << “kofi” : cout << “ama”;

c. Program **:=**

d. movl ox 1, n

A20. A collection of computer programs provided by the computer manufacturer that contribute to the control and performance of the computer system is called?

a. System Software

b. Translators

c. Utilities

d. All of the above

A21. In lexical structure of programming languages, names chosen by the language designer to determine the syntactic structure are called …….

a. Operators

b. Keywords

c. Separators

d. Identifiers

A22. Which one is a 4^{th} Generation computer language?

a. Assembly

b. Prolog

c. SQL

d. Visual BASIC

A23. A computer language which has simple machine-like instructions and direct access and allocation of memory?

a. Assembly

b. Prolog

c. SQL

d. Visual BASIC

A24. The principle to make the same High Level Language (HLL) run on different machines is described as …

a. Machine independence of HLL

b. Program portability

c. Problem-oriented

d. Machine-dependence

A25. The C++ statement **bool fan ;** is a …….

a. declaration statement

b. definition statement

c. logical statement

d. relational statement

A26. What is the output of the C++ code segment below?

…….

```
int step1, xbig =0;
float big = 3.6;
float xsmall = 0.0;
bool on1 = false;
if ( !on1 )
   {    xbig = big/3;
        step1 = 1;
        cout << xbig << “  “ << step1 << endl;
   }
else
   {    xsmall = big/3.0;
        step1 = 2;
        cout << xsmall << “  ” << step1 << endl;
   }
```

a. 1 1

b. 1.2 1

c. 1 2

d. 1.2 2

A27. In the C++ statement:- **cout ……. “My name is kofi” ;** the missing operator is called …

a. Extraction operator

b. Insertion operator

c. Assignment operator

d. Pipe operator

A28. In designing a computer program, reliability implies …

a. The program will be easy to change or modify when the need arises.

b. The program causes the tasks to be done quickly and efficiently.

c. The program will be transferable to a different computer with a minimum of modification.

d. The program can be depended upon always to do what it is supposed to do.

A29. A program that meets its wrongly defined specification is said to be …

a. incorrect

b. unsuitable

c. Not fully specified

d. Not computable

A30. At the analysis stage of programming methodology, program specification must be

defined in terms of the following except which one?

a. Flowchart specification
b. I/O specification
c. Process specification
d. Limitations of the program

A31. Which of the following is a translator?

a. Assembly
b. Assembler
c. Text Editor
d. All of the above

A32. Parsing is a process whereby given a sequence of lexical symbols, …

a. the grammar is used to structure them into meaningful units
b. the token is used to structure them into meaningful units
c. the linker is used to structure them into meaningful units
d. the loader is used to structure them into meaningful units

A33. At which stage of programming methodology is the processing needed by the program specified?

a. Analysis stage

b. Coding stage

c. Design stage

d. Problem definition stage

A34. In designing a computer program, performance implies …

a. The program will be easy to change or modify when the need arises.

b. The program causes the tasks to be done quickly and efficiently.

c. The program will be transferable to a different computer with a minimum of modification.

d. The program can be depended upon always to do what it is supposed to do.

A35. What is the output of the C++ code segment below?

…….

```
int step1, xbig =0;
float big = 3.6;
float xsmall = 0.0;
bool on1 = false;
if ( on1  && big > 3  ||  xbig > 0  )
   {    xbig = big/3;
        step1 = 1;
```

```
        cout << xbig << "   " << step1 << endl;
    }
else
    {   xsmall = big/3.0;
        step1 = 2;
        cout << xsmall << "   " << step1 << endl;
    }
```

a. 1 1

b. 1.2 1

c. 1 2

d. 1.2 2

A36. …… serves as a basis to derive computer language processors semi-automatically

a. Translator
b. Assembler
c. Lexis
d. Context-free grammar

A37. In computer language analysis, the meaning of a sentence is the ….

a. Syntax

b. Tokens

c. Lexis

d. Semantics

A40. Context conditions in a language definition are conditions concerning …..

a. Entities in the program.

b. Syntax in the program.

c. Lexis in the program.

d. All of the above

A41. Which stage of programming methodology prescribes how the program should be written?

a. Analysis stage

b. Coding stage

c. Design stage

d. Problem definition stage

A42. Integration testing of a program involves …

a. Testing the separate components.

b. Testing the whole program once it is in its final form in which it will be used.

c. The user of the program testing the program to see that it is what is required.

d. Testing the separate components as they are put together.

A43. A program that meets its rightly defined specification is said to be …

a. Correct

b. Suitable

c. Fully specified

d. computable

A44. System testing of a program involves ….

a. Testing the separate components.

b. Testing the whole program once it is in its final form in which it will be used.

c. The user of the program testing the program to see that it is what is required.

d. Testing the separate components as they are put together.

A45. A major advantage of good program documentation is ….

a. It aids maintenance of the program during its lifetime.

b. It allows programmers to divide the task.

c. It dictates the programming paradigm.

d. It makes program cracking difficult.

A46. For a programming task there may exist many alternative algorithms. For practical reasons knowledge of the …… of the alternatives will help the programmer make the best choice.

a. Correctness

b. Computability

c. Complexity

d. Logic

A47. To prove that a program is correct …

a. Show that for one input to the program, the program will produce the required results.

b. Show that for all inputs to the program, the program will produce the required results.

c. Show that for all permissible inputs to the program the program will produce the required results.

d. Show that for all inputs to the program, the program will produce results.

A48. Functional Testing of programs involves …..

a. The use of typical, extreme and valid data values that are representative of those covered by the specification as input, and observing the output

b. The use of typical, extreme and invalid data values that are representative of those covered by the specification as input, and observing the output.

c. Examining the external structure of the program and selecting data which give rise to the alternative cases of flow control.

d. Examining the internal structure of the program and selecting data which give rise to the alternative cases of flow control.

A49. The following are constructs that can be used in algorithms, except which one?

a. Decision

b. Question

c. Repetition

d. Sequence

A50. Which of the following is a characteristics of algorithms?

a. Algorithms are step-by-step method of solving a problem or doing a task.

b. Algorithms accept input data and create an output data

c. Algorithms are programs.

d. All of the above

A51. Logical Testing of programs involves …..

a. The use of typical, extreme and valid data values that are representative of those covered by the specification as input, and observing the output

a. The use of typical, extreme and invalid data values that are representative of those covered by the specification as input, and observing the output.

b. Examining the external structure of the program and selecting data which give rise to the alternative cases of flow control.

a. Examining the internal structure of the program and selecting data which give rise to the alternative cases of flow control.

A52. MS-DOS kernel command that deletes all ***h*** files with extension ***.txt*** from the subfolder ***moon*** on the local disk ***C: assume the command prompt is C:>***

a. del h*.txt

b. del C:\h???.txt

c. del C:\moon\h.txt

d. del C:\moon\h*.txt

A53. Which statement is not correct about C++ language?

a. A program can contain one or many functions but must always have a function called m ain().

b. The main() is the starting point of all C++programs.

c. The compiler will compile the code units without the main()

d. The main() is the ending point of all C++ programs.

A54. Which one is not a valid C++ identifier?

a. kkme5

b. jj4my

c. jjmy kkme

d. jjmy_kkme

A55. Which one is not a C++ keyword?

a. break

b. catch

c. shout

d. for

A56. Which one is a correct C++ statement?

a. char “T”;

b. char ‘kofi’;

c. char ’k’

d. char ‘k’;

A57. The C++ arithmetic statement fat = fat + lean; can be rewritten as:-

a. fat =+lean

b. fat +=lean

c. fat +=lean;

d. fat =+lean;

A58. The correct answer when the expression -34%5 is evaluated is:-

a. -6.4

b. -6

c. 4

d. -4

A59. The correct answer when the expression 3 * 7 – 6 + 2 * 5 / 4 + 6 is evaluated is :-

a. 27.25

b. 23.5

c. 23

d. 27

A60. In logic programming ……..

a. The programmer expresses procedures.

b. The programmer expresses algorithms.

c. The programmer expresses what to do and in what order

d. The programmer expresses what is required rather than how it is done.

SECTION B (40 MARKS)

In this section, there are four questions, answer any two. Each question carries 20 marks.

B1. (20 marks)

a. State the 5 rules of Extended Backus Naur Form.

b. Given a set of integers,

I. Design a **flowchart** to find the maximum integer value in the set.

II. Design an **algorithm** to find the maximum value in the set

B2. (20 marks)

A formula for calculating the variance of an entire population of size N is

$$\sigma^2 = (\bar{x^2}) - \bar{x}^2 = \frac{\sum_{i=1}^{N} x_i^2 - (\sum_{i=1}^{N} x_i)^2/N}{N}.$$

Assuming the formula for calculating the variance is a complex task :-

a. Use Top-down design to break the task into at least two or more subtasks.

b. Write a C++ program that solves the problem of finding the variance of a set of N integers. (You may use functions)

B3. (20 marks)

a. Define machine Instruction Set.

b. List the six generic types of machine Instruction Set.

c. i. Draw the 7-Layer model of Digital Electronic computers.

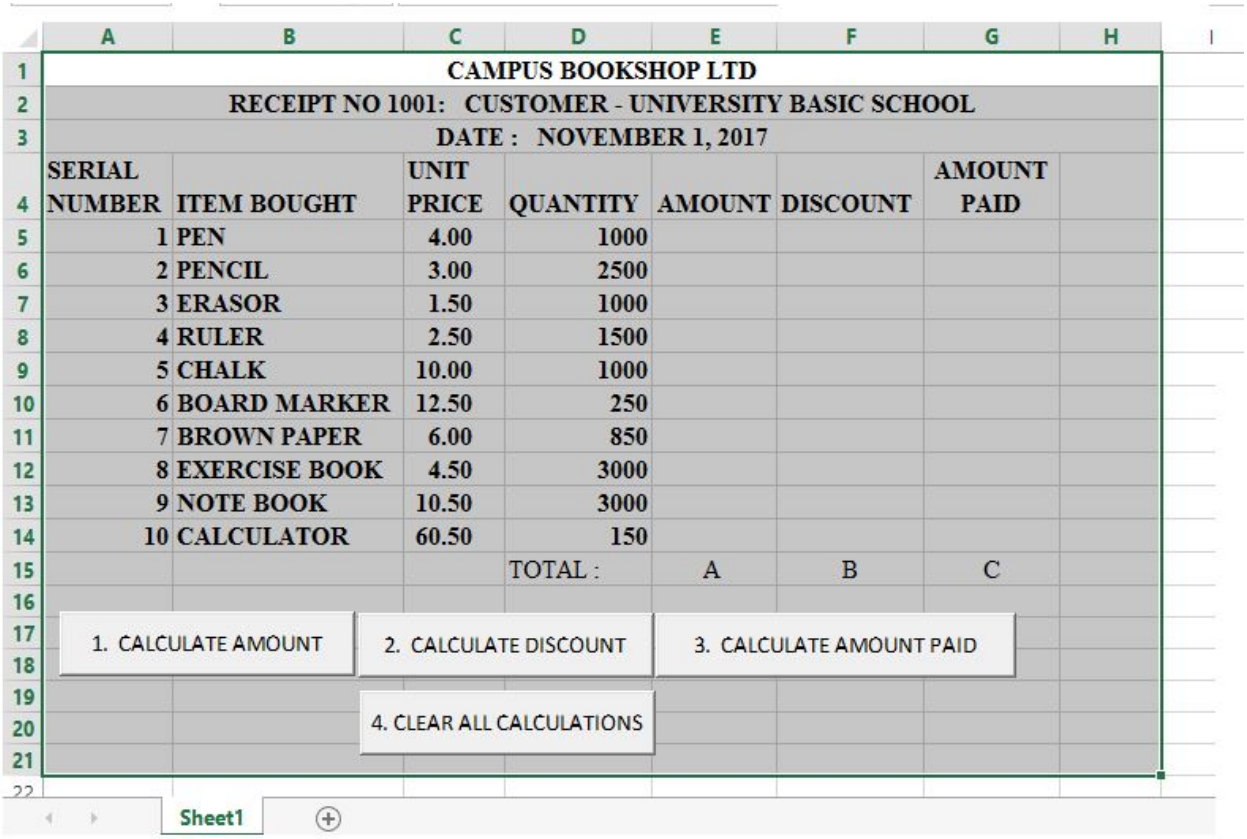
ii. Describe the major function of each layer.

a. Write MS-DOS kernel **batch program** that will perform the following activities:-

- Make a folder called ***water*** with a subfolder ***fish*** on the root of the local disk ***C:***
- Make a folder called ***sun*** with a subfolder ***cloud*** on the root of the local disk ***C:***
- Copy all files with extension ***.exe*** from the root of the local disk to ***water*** and to ***clou d***.
- Copy all b files with extension ***.exe*** from ***cloud*** to ***fish***.
- Copy all ***four character file names*** with the third character in the filename as ***d*** with the extension ***.exe*** from ***fish*** to ***sun***.

B4. (20 marks)

Presented below is a MS-EXCEL worksheet.



The worksheet shows 10 items (column B) bought by the customer and the corresponding unit prices (column C) and the quantity bought of each item (column D).

Required

Write VBA ***onClick event handler*** for the four command buttons shown in the worksheet:-

a. 1 CALCULATE AMOUNT : the Amount for each item is given by UNIT PRICE x Quantity and the cell **labeled A** is the Total Amount for the ten items.

a. 2 CALCULATE DISCOUNT : for items whose AMOUNT is more than 20,000 a Discount of 5% of the AMOUNT is given. Calculate the **amount of discount** given for items affected. The cell **labeled B** is the Total Discount.

a. 3 CALCULATE AMOUNT PAID : the Amount Paid is given by the AMOUNT – DISCOUNT Amount. The cell **labeled C** is the Total Amount Paid.

b. 4 CLEAR ALL CALCULATIONS : this event clears all **calculated values** in the worksheet.