

September 2013 – Computing Advanced

Paper 1

Section A

Question 1

The output is the following:

SubClass: methodA

SubClass: methodB 5

Question 2

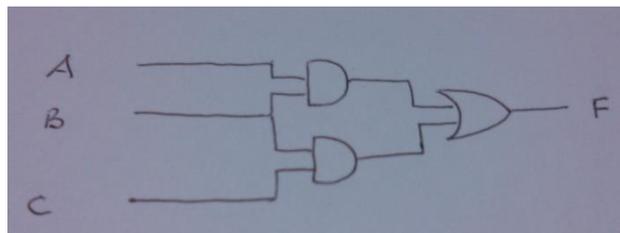
The code will not execute because SuperClass is abstract so it cannot be instantiated.

Section B

Question 3

- i. $1011.01_2 = 11.25_{10}$
 - ii. $11111.11_2 = 31.75_{10}$
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Question 4

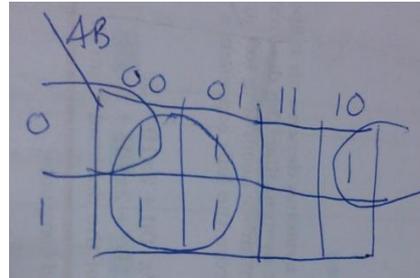


Question 5

9 additions: first number is put in accumulator, second number is added to it, third number is added to the total, etc.

Question 6

A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0



$$F = \bar{A} + \bar{B}.C$$

Question 7

RAM

Question 8

ADSL: Asymmetric Digital Subscriber Line

ISDN: Integrated Services Digital Network

FTP: File Transfer Protocol

IMAP: Internet Message Access Protocol

POP3: Post Office Protocol 3

Question 9

A logical address space does not specify the actual memory address. The physical address space indicates the exact address in RAM where the data or program is placed.

Question 10

Cybercrime refers to illegal activities involving information kept on computers. Two examples are (1) software piracy, and (2) hacking.

Question 11

Interrupts are messages sent by devices directly to the processor. In polling the processor periodically checks whether the devices have any messages for it.

Question 12

- a. TCP/IP stands for Transmission Control Protocol/Internet Protocol.
 - b. 3 main functions are:
 - i. manages the data transmission over the Internet
 - ii. TCP (the higher layer) breaks data into packets; it manages multiplexing
 - iii. IP (the lower layer) manages the arrival of packets to their destination
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Question 13

- a. Lexical analysis is the process of converting a sequence of characters into a sequence of tokens. A program or function which performs lexical analysis is called a lexical analyser, lexer or scanner. Syntactic analysis, or parsing, is needed to determine whether the sequence of tokens that constitute the program are presented according to the grammar of the language. During these two phases the symbol table is constructed.
 - b. An identifier.
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Question 14

- a. It describes the meaning of words. It may also give the equivalent in another (natural) language.
 - b. It means that a statement is written according to the grammar of the language.
 - c. It means that what is written makes sense.
 - d. A meta-symbol is a symbol used in a meta-language (a meta-language is used to define the grammar of another language).
 - e. A terminal symbol forms part of the vocabulary of a language. It cannot be generated further to form other symbols.
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Question 15

- (i) System documentation i.e. overall design of new system e.g. DFD, use-case diagrams etc.
- (ii) Program documentation i.e. a detailed plan of the program using e.g. flowcharts or pseudocode.

Other documents are:

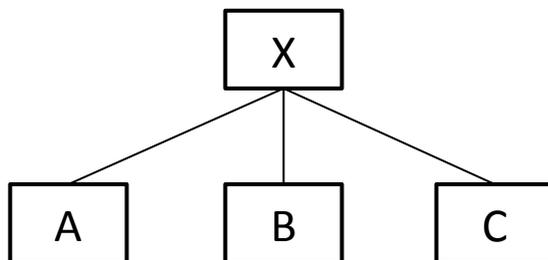
- architecture document: showing hardware and software planned to be purchased or constructed
- schedule of work (implementation plan)
- critical priority analysis (i.e. a list of critical tasks; it is absolutely necessary to successfully accomplish a critical task - the project will succeed or fail based on the outcome of these tasks)
- performance analysis: ways to check whether the project is on target or not.
- test plan

Question 16

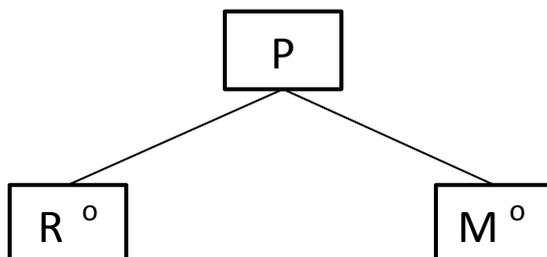
- Modularity implies the practice of dividing a program into a number of modules e.g. various classes and various methods.
- Three advantages of modularity are:
 - Less errors. Each module is smaller than a monolithic program and can be separately tested.
 - Errors are more easily corrected.
 - It is easier to upgrade the program.

Question 17

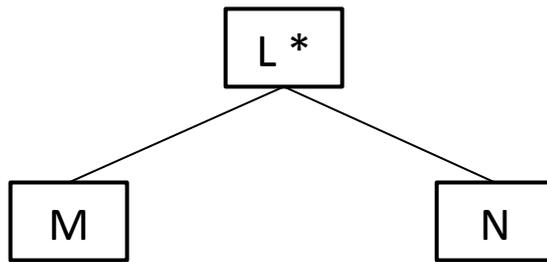
- Sequence: the sequence of modules A, B and C forms X.



- Selection: P is either R or M.



- Iteration: L is repeated 0 or more times



Question 18

- The signature of a method is made up of just the method name and the parameter names and types.
 - Method overriding occurs when a method in a derived class is redefined. This is not to be confused with overloading which occurs when two or more methods in the same class have the same name.
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Question 19

Schema means a description of data.

- The three schemas are (i) physical (internal) schema, (ii) conceptual (logical) schema, and (iii) external schema.
 - The physical schema describes details of how data is stored: files, indices etc. The conceptual schema describes how a user would look at a database e.g. tables, primary keys etc. The external schema describes the part of the database that suits the user (i.e. the part that is visible to the user).
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Question 20

Security can be viewed from the point of view of making sure data was not lost or corrupted and also from the point of view of guaranteeing privacy. Many security failures are reported each year. Cybercriminals take advantage of them. Some of the failures are: faults in design and implementation making it possible for hackers to strike; lack by system administrators to install security patches making it possible for worms to be effective; lack of encryption of data; insiders that steal archives for money or revenge; sub-standard encryption key management – this involves keeping encryption keys in a place where hackers or insiders can access them.
