

REPUBLIC OF CAMEROON

Peace-Work-Fatherland

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MINISTRY OF HIGHER EDUCATION

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NATIONAL COMMISSION FOR THE  
ORGANIZATION OF THE HIGHER  
NATIONAL DIPLOMA EXAM (HND)

.....

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MINISTERE DE L'ENSEIGNEMENT SUPERIEUR

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COMMISSION NATIONAL D'ORGANISATION  
DE L'EXAMEN DU HND

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Field: **COMPUTER ENGINEERING**  
 Specialty: **COMPUTER ENGINEERING**  
 Option: **SOFTWARE ENGINEERING**  
 Exam Paper: **PRACTICE OF COMPUTER**  
 Credit value :**8**  
 Duration: **5 HOURS**  
 NATURE OF EXAM: **PRACTICAL**  
 Code: **SWE 20**

**2020-2021 SESSION****I. STRUCTURED PROGRAMING ( C PROGRAMMING) 25MKS**

Foukou Melen has just called you a software engineer. In fact the general manager required some help from you in <sup>order</sup> ~~other~~ to better manage his shop. Your job will be to write down some of your excellent program. You are provided with the following:

Any toy he sells has a name, a category (video games, comics, family games....), a supply price (the price at which he got the toy from his supplier), the sale price (the price at which the product is sold in the shop) and finally the quantity already sold.

- 1) Write a small c function called collect , that collects from the user, data for one unique toy, saves them into a variable of type Product, then later displays the benefit gained from that particular toy. **3mks**

For the rest of this problem, we consider that toys data are stored into an array of less 100 items of type Product.

- 2) Write a function collectData that fills up the array of toy data provided by the user **4mks**
- 3) Write a function called benefit that returns the general benefit. The General benefit is the sum of benefit obtained in each toy. The benefit on one toy is (sale price – supply price)\*quantity sold. **4mks**
- 4) Write a function called mostSold that returns the name of the most sold product. The most sold product is the one that has the highest quantity sold **4mks**

- 5) Write a function called bestProduct that returns the best product. The best product is the one that has the highest benefit **4mks**
- 6) Write a function called worstProduct that returns the worst product. The worst product is the one having the lowest ratio  $(\text{toy benefit})^2 / \text{quantity sold}$ . **4mks**
- 7) Demonstrate the functionality (ie call the functions) of the functions in the main function **2mks**

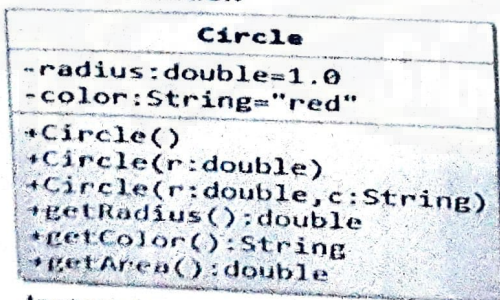
**II. OBJECT ORIENTED PROGRAMMING (C++ OR JAVA PROGRAMMING) 25MKS**

1. A class called Circle is to be defined as illustrated in the class diagram. It contains two data members: radius (of type double) and color (of type String); and three member functions: getRadius(), getColor(), and getArea().

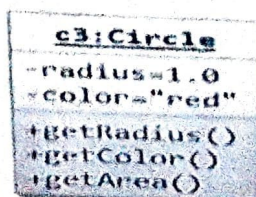
Three instances of Circles called c1, c2, and c3 shall then be constructed with their respective data members, as shown in the instance diagrams.

Implement the class diagram in a programming either c++ or java programming. Remember that class attributes are initialized in a constructor. Making good use of the getter function display all the attributes of the three instances. Also display the area of each of the object. Write comments indicating the type of access specifier used in the attributes. **10mks**

**Class Definition**



**Instances**



2. Create three classes named SWE ,NWS and CSN. Create another class named ICT which inherits both the above classes. Now, create a function in each of these classes which prints "I am a software student ", "I am a network and security student" ,"I am a computer network and security student" "I belong to all categories: SWE, NWS and CSN" respectively. These functions should have the same name display() except that of class ICT which will have the name displayICT(). Now, in the main method create an object for each of the above class and try calling
- i. function of SWE by the object of SWE
  - ii. function of NWS by the object of NWS
  - iii. function of CSN by the object of CSN
  - iv. function of ICT by the object of ICT
  - v. call the function of each of its parent by the object of ICT
  - vi. in a comment , state which type of in heritance is this . Also comment on how you have resolve ambiguity in v above. **15marks**

**SECTION B: Database Development and Administration (MySQL). (20marks)**

Carry out the following exercises in Mysql

- a. Write an SQL statement to create a table named jobs including columns job\_id, job\_title, min\_salary and max\_salary, and make sure that, the default value for job\_title is blank and min\_salary is 8000 and max\_salary is NULL will be entered automatically at the time of insertion if no value assigned for the specified columns.Expected results :

```
mysql> DESC jobs;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| JOB_ID     | varchar(10)   | NO   | PRI | NULL    |       |
| JOB_TITLE  | varchar(35)   | NO   |     |         |       |
| MIN_SALARY | decimal(6,0)  | YES  |     | 8000    |       |
| MAX_SALARY | decimal(6,0)  | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.01 sec)
```

(5mks)

b. Create a table that looks like the one below. You must not use exactly the same values

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID
100	Steven	King	SKING	515.123.4567	1987-06-17	AD_PRES
101	Neena	Kochhar	NKOCHHAR	515.123.4568	1987-06-18	AD_VP
102	Lex	De Haan	LDEHAAN	515.123.4569	1987-06-19	AD_VP
103	Alexander	Hunold	AHUNOLD	590.423.4567	1987-06-20	IT_PROG
104	Bruce	Ernst	BERNST	590.423.4568	1987-06-21	IT_PROG
105	David	Austin	DAUSTIN	590.423.4569	1987-06-22	IT_PROG
106	Valli	Pataballa	VPATABAL	590.423.4560	1987-06-23	IT_PROG

(5mks)

c. Write a query to display the name (first\_name, last\_name), salary and PF (15% of salary) of all employees from the table above.

(5mks)

d. Write a query in SQL to display the full name (first and last) name, and salary, for all employees whose salary is out of the range 7000 and 15000 and make the result set in ascending order by the full name.

Sample results :

name	salary
Alana Walsh	3100.00
Alexander Khoo	3100.00
Alexis Bull	4100.00
Amit Banda	6200.00
Anthony Cabrio	3000.00
Britney Everett	3900.00

(5mks)

**SECTION C: WEB PROGRAMMING. (15marks)**

a)

Create a HTML page with one button. When the user clicks on the button, the function displaymessage() should be called. The function is used to open the prompt box and then to display the alert box. The user should enter his/her name in the prompt box. After that an alert box with message "Your name is your\_name" should be displayed (4 pts)

b.

Create the following form using html 5:

First Name:   
 Email:   
 Subject:   
 Country:

Comment:

Gender:  M  F

Highest degree level  Post-Doc  
 Ph.D  
 Master/MS.c  
 Licence/BS.c  
 Bacc/AL-GCE

Let the placeholder of first name be *TUBUO*, *ministry@gmail.com* and subject be *programming*. These fields must be filled before the form is submitted ie required

c. Create an external CSS to style the form above.

d. Create a database called application, a php script to connect to the form to the database, add the database records from the form

**Section D: NETWORKING. (15marks)**

Materials required:

- Three (3) computers equipped with NIC cards. Yours and that of your two neighbors.
- One (1) switch

- Three (3) twisted pair cables of 2meters each.
- RJ-45 Connectors
- Crimping tool
- Cable Tester

Let's consider the following IP address: 10.0.0.0 with the subnet mask: 255.255.0.0.

- 1- Using appropriate tools, crimp necessary cables for the exercise. **(5mks)**
- 2- Use a tester to test the crimp **(2mks)**
- 3- Make groups of three. Assign the first three IP address of this network to the computers. **(3mks)**
- 4- Connect to the switch. Using the *ping* command test the connectivity between the computers. The command should be successful.  
**(5mks)**