THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME: LEVEL 03
FINAL EXAMINATION: 2010/2011
CPU 1141/CSU1180: INTRODUCTION TO COMPUTER PROGRAMMING / PROGRAMMING
PERSPECTIVES & LANGUAGES
DURATION: TWO HOURS (2-HOURS)

DATE: 11ᵗʰ January, 2011   TIME: 1.30 p.m. to 3.30 p.m.

Answer FOUR questions ONLY, selecting two questions from each part (Part A and Part B).
Each question carries equal marks.

PART – A

Q1.

(i)   What are the main differences between *functions* and *procedures* in Pascal?

(ii)   Write Pascal functions/procedures to carry out the following tasks:

     (a)   valid(a,b,c) - This receives values of the sides of a triangle a, b and c and it prints an appropriate message relevant to validity of the triangle.

             Note: The triangle is valid if the sum of two sides is greater than the largest side of the triangle.

     (b)   area(h, r)   -   This receives the height (h) and the radius (r) of a cylinder and it returns the value of the surface area of the cylinder.

             Note: surface area of a cylinder $= 2\pi r^2 + 2\pi rh$

Q2.

(i)   Briefly explain *User Defined data types* in Pascal giving examples.

(ii)   State whether the following declarations are valid or invalid. If invalid, give reasons.

(a) TYPE
      units =(meter,inches,feet);
   VAR
      Length :units;

(b) TYPE
      measure=(weight,length,volume,density);
      mass=(pounds,kilo,weight);

(c) TYPE
      days:=(Monday,Tuesday,Friday);
   VAR
      working_day:days;

(iii) A record contains the name of an employee, employee code and the year joined. Write a Pascal program to read the information of 100 employees. Print the names of those employees whose work experience is 20 years or more than 20 years according to the given current year.

Q3.

The students should obtain at least 40% average mark for both CBT and OBT tests in order to be eligible to sit for the final examination of CPU1141.

Write a Pascal program to do the following tasks:

(i) Define a two-dimensional array called *student_ mark* to store marks of CBT and OBT and the index number of 200 students.

   Note: Index no. is an integer, for example: 89234

(ii) To read the index no, percentage mark for CBT and percentage mark for OBT into the two dimensional array.

(iii) To calculate the average marks of CBT and OBT of each student and store it in another one-dimensional array called *average*.

(iv) To print the eligibility list, that is the index numbers of the students who are eligible.

PART – B

Q4.

(i) Write C codes for the following parts.

   (a) Define a variable to store the price of a watch and print the price with two decimal places.

   (b) Copy the content of string variable S1 into another string variable S3.

   (c) Find the elder between you and your friend using the *conditional operator*.

   (d) Define a variable to store your name and read your name with spaces. (Eg: Arjuna Zoysa)

(ii) What are the data types you would select to represent the following data in C language? Briefly explain why you selected the particular type for each data.

   (a) Index number of a student.(eg: AS2008234)

   (b) Population of Sri Lanka.

   (c) Height of a coconut tree.

(d) Avogadro's constant (6.022×10^{23})

(iii) Give suitable variable/constant declarations for each of the above data items in part (ii).

(iv) State whether the following statements are "True" or "False".

(a) Assembly language uses only binary digits (1s and 0s).

(b) C language supports a method to initialize variables by enclosing the initial value between parentheses.

(c) The word "*Short*" cannot be used for a variable name in C language.

(d) C language offers three different floating point data types.

Q5.

(i) Briefly explain the "*switch*" statement in C language.

(ii) One of the data types in C language does not work with the switch statement. What is it?

(iii) Compare the *break* and *continue* statements in terms of their behavior

(iv) An electricity company has 3 categories of customers, namely, industrial, business, and domestic. The charges are calculated monthly based on the number of electricity units consumed by each customer. The rates of such consumptions are as follows:

Units	Industrial	Business	Domestic
0-500	Rs. 1500.00	Rs. 1000.00	Rs. 250.00
501-1000	Rs. 0.40 per unit	Rs. 0.25 per unit	Rs. 0.15 per unit
1001-1100	Rs. 0.30 per unit	Rs. 0.20 per unit	Rs. 0.10 per unit
over 1100	Rs. 0.20 per unit	Rs. 0.15 per unit	Rs. 0.05 per unit

You are given the following information:

- customer number
- category of the customer
- previous meter reading
- current meter reading

Write a C program to calculate and print the charges for the electricity consumption by reading the customer data given above.

Q6.

   (i)   Write the syntax for declaring a *union* data type in C language.

   (ii)   What would be the output of the following program?

```c
#include<stdio.h>
int main()
{
    union employee{
        int start_year;
        int dpt_code;
        int id_number;
    }info;

    info.strat_year=1997;
    info.dpt_code=8;
    info.id_number=1234;

    printf("Start Year:%d\n",info.start_year);
    printf("Dept.Code:%d\n",info.dpt_code);
    printf("Id Number%d\n",info.id_number);
    return 0;
}
```

   (iii) Write a C program to ask the user to enter his or her name. Then ask the user whether he or she is an U.S citizen. If the answer is "yes", ask the user to enter the name of the state where he or she comes from. Otherwise, ask the user to enter the name of the country he or she comes from. (You are required to use a *union* in your program.)

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