SURE AKSHITA.

Atal Bihari Vajpayee
Indian Institute of Information Technology and Management Gwalior

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Minor Examination

Course Code: CS102/BCCS-1201
Venue: 105, 106, 203, 204, 205, 207, LT-II
Max Marks: 30

Course Name: Data Structures
Date: 28/02/2024
Time Allowed: 02 Hrs. (10:00 Hrs. – 12:00 Hrs.)

Note: (i) More than one option may be correct for the objective type questions.
(ii) In objective question, marks will be awarded only if there is a justification for the option(s).
(iii) Attempt all the questions.

1. Complete the following table. (3)

Last In Last Out	It represents the philosophy (concept) of <which data structure>?
Last In First Out	It represents the philosophy (concept) of **Stack**.
First In Last Out	It represents the philosophy (concept) of <which data structure>?
First In First Out	It represents the philosophy (concept) of **Queue**.

Explain your answer with examples.

2. What is the output of following function in which start is pointing to the first node of the following linked list 1->2->3->4->5->6? (3)

```
void fun(struct node* start)
{
 if(start == NULL)
  return;
 printf(\"%d  \", start->data);

 if(start->next != NULL )
  fun(start->next->next);
 printf(\"%d  \", start->data);
}
```

3. Following is an incorrect pseudocode for the algorithm which is supposed to determine whether a sequence of parentheses is balanced: (3)

```
declare a character stack
while (more input is available)
{
  read a character
  if (the character is a '(' )
    push it on the stack
  else if (the character is a ')' and the stack is not empty)
    pop a character off the stack
  else                    ( A ( B )
    print "unbalanced" and exit
}
print "balanced"
```

Correct the above code.

4. The following postfix expression with single digit operands is evaluated using a stack: (3)

8 2 3 ^ / 2 3 * + 5 1 * -

Note that ^ is the exponentiation operator. The top two elements of the stack after the first * is evaluated are: ____, ____.

5. Assume that the operators +, -, × are left associative and ^ is right associative. The order of precedence (from highest to lowest) is ^, x, +, -. The postfix expression corresponding to the infix expression a + b × c - d ^ e ^ f is ___. (3)

6. An array A consists of n integers in locations A[0], A[1] ....A[n-1]. It is required to shift the elements of the array cyclically to the left by k places, where 1 <= k <= (n-1). Write a complete program for doing this without using another array. (3)

7. What does the following function do for a given Linked List with first node as head? (3)

```
void fun1(struct node* head)
{
 if(head == NULL)
  return;

 fun1(head->next);
 printf("%d ", head->data);
}
```

8. Refer to the pseudo code below. Assume that IntQueue is an integer queue, enqueue is insertion in the queue and dequeue is deletion from the queue. What does the function fun do? (3)

```
void fun(int n)
{
   IntQueue q = new IntQueue();
   q.enqueue(0);
   q.enqueue(1);
   for (int i = 0; i < n; i++)
   {
      int a = q.dequeue();
      int b = q.dequeue();
      q.enqueue(b);
      q.enqueue(a + b);
      print(a);
   }
}
```

9. What will be the output of the following function if it is run with n = 100? (3)

```
#define LIMIT 1000
void fun2(int n)
{
 if (n <= 0)
   return;
 if (n > LIMIT)
  return;
 cout << n <<" ";
 fun2(2*n);
 cout << n <<" ";
}
```

10. A single array A[1 ... MAXSIZE] is used to implement two stacks. The two stacks grow from opposite ends of the array. Variables top1 and top2 (top1 < top 2) point to the location of the topmost element in each of the stacks. If the space is to be used efficiently, the condition for "stack full" is ___. (3)

**** Best of ~~Luck~~ Hard Work ****