

義守大學九十二學年度轉學生入學招生考試

『資料結構』參考試題

1. (40%) Short Answer

- (a) What are preconditions and postconditions of a program?
- (b) Name three kinds of parameters.
- (c) Why should side effects of functions be avoided?
- (d) What are the differences between information hiding and encapsulation?
- (e) How is a circular array implemented in a linear array?

2. (20%) Write a program that makes use of a stack to read in a single line of text and write out the characters in the line in reverse order.

3. (20%) Consider the function $f(n)$ defined as follows, where n is a nonnegative integer:

$$f(n) = \begin{cases} n & \text{if } n \leq 1; \\ n + f(\frac{1}{2}n) & \text{if } n \text{ is even, } n > 1; \\ f(\frac{1}{2}(n+1)) + f(\frac{1}{2}(n-1)) & \text{if } n \text{ is odd, } n > 1. \end{cases}$$

- (a) For each of the following values of n , draw the recursion tree and calculate the value of $f(n)$.
 - (i) $n = 5$
 - (ii) $n = 6$
- (b) Write a program to implement this function.

4. (20%) By hand, trace the action of heap sort on the following seven numbers which will be sorted into increasing order:

26 33 35 29 19 12 22

- (a) Draw the initial tree to which the list corresponds
- (b) Show how it is converted into a heap
- (c) Show the resulting heap as each entry is removed from the top and the new entry inserted.