Exercise: Dynamic Memory Allocation **Date:** 29/07/2021

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1. Write a program in C to find the largest element using Dynamic Memory Allocation (malloc).

Code:

```c
#include <stdio.h>
#include <stdlib.h>

int main() {
  int n;
  int *data;
  printf("Enter the total number of elements: ");
  scanf("%d", &n);

  // Allocating memory for n elements
  data = (int *)malloc(n*sizeof(int));
  if (data == NULL) {
  printf("Error! Memory not allocated...");
  exit(0);
  }

  // Storing numbers entered by the user.
  for (int i=0; i<n; i++) {
  printf("Enter num%d: ", i+1);
  scanf("%d", data+i);
  }

  // Finding the largest number
  for (int i=1; i<n; i++) {
    if (*data < *(data+i)) {
      *data = *(data+i);
    }
  }
  printf("Largest number = %d\n", *data);

  free(data);

  return 0;
}
```

Output:

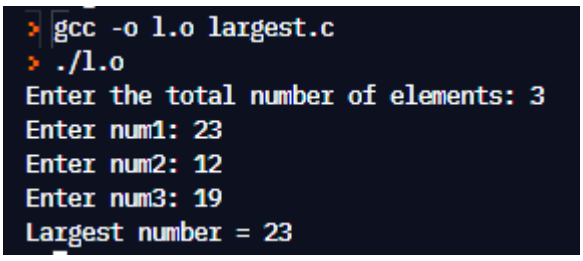
```
> gcc -o l.o largest.c
> ./l.o
Enter the total number of elements: 4
Enter num1: 15
Enter num2: 22
Enter num3: 56
Enter num4: 34
Largest number = 56
```

2. Write a program in C to find the largest element using Dynamic Memory Allocation (calloc).

Code:

```c
#include <stdio.h>
#include <stdlib.h>

int main() {
  int n;
  int *data;
  printf("Enter the total number of elements: ");
  scanf("%d", &n);

  // Allocating memory for n elements
  data = (int *)calloc(n,sizeof(int));
  if (data == NULL) {
  printf("Error! Memory not allocated...");
  exit(0);
  }

  // Storing numbers entered by the user.
  for (int i=0; i<n; i++) {
  printf("Enter num%d: ", i+1);
  scanf("%d", data+i);
  }

  // Finding the largest number
  for (int i=1; i<n; i++) {
    if (*data < *(data+i)) {
      *data = *(data+i);
    }
  }
  printf("Largest number = %d\n", *data);

  free(data);

  return 0;
}
```

Output:



3. Write a c program to get 10 values from the user and find the sum and average of the elements using dynamic memory allocation concept.

Code:

```c
#include <stdio.h>
#include <stdlib.h>

int main() {
  int n=10;
  int *data;

  // Allocating memory for n elements
  data = (int *)malloc(n*sizeof(int));
  if (data == NULL) {
  printf("Error! Memory not allocated...");
  exit(0);
  }

  // Storing numbers entered by the user and finding the sum, average
  float sum=0, avg;
  for (int i=0; i<n; i++) {
  printf("Enter num%d: ", i+1);
  scanf("%d", data+i);
  sum+=*(data+i);
  }
  avg=sum/n;

  printf("Sum: %.2f\n", sum);
  printf("Average: %.2f\n", avg);

  free(data);

  return 0;
}
```

Output:

```
> gcc -o sa.o sumavg.c
> ./sa.o
Enter num1: 1
Enter num2: 2
Enter num3: 3
Enter num4: 4
Enter num5: 5
Enter num6: 6
Enter num7: 7
Enter num8: 8
Enter num9: 9
Enter num10: 10
Sum: 55.00
Average: 5.50
```