

1) Write code for a general FIFO queue (a stack). Write the function `insert()` and `remove()` So the following program works.

```
#include <stdlib.h>
struct FIFO_node {
void * pFIFO_object;
struct FIFO_node *prNext;
};
void insert (struct FIFO_node ** prList,
void * pObject);
void * remove(struct FIFO_node ** prList);
int main(void)
{
int nVect[3]={1,2,3};
char *pcName = "Charles";
int *pData;
void *pTemp;
struct FIFO_node * prMyList = NULL;
pData = &nVect[2];
insert (&prMyList, (void *)&nVect[0]);
insert (&prMyList, (void *)pcName );
insert (&prMyList, (void *)pData );
pTemp = remove (&prMyList);
if(pTemp != pData)
return (-1); /* Fail */
pTemp = remove (&prMyList);
if(pTemp != pcName)
return (-1); /* Fail */
pTemp = remove (&prMyList);
if(pTemp != &nVect[0])
return (-1); /* Fail */
return (1) ; /* OK */
}
```

2) Write a function

```
stats_vars calc_stats(double dVec[], int nVals);
```

where

stats\_vars

is a own made data type, consiting of:

- 1) Average of the input vector dVec [ ]
- 2) The minimum value of the input vector dVec [ ]
- 3) The maximum value of the input vector dVec [ ]
- 4) The variance, according to the formula bellow:

$$\sigma^2 = \frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2$$

Test the code on this vector of 100 numbers.

0.9501, 0.2311, 0.6068, 0.4860, 0.8913, 0.7621, 0.4565, 0.0185, 0.8214, 0.4447, 0.6154, 0.7919, 0.9218, 0.7382, 0.1763, 0.4057, 0.9355, 0.9169, 0.4103, 0.8936, 0.0579, 0.3529, 0.8132, 0.0099, 0.1389, 0.2028, 0.1987, 0.6038, 0.2722, 0.1988, 0.0153, 0.7468, 0.4451, 0.9318, 0.4660, 0.4186, 0.8462, 0.5252, 0.2026, 0.6721, 0.8381, 0.0196, 0.6813, 0.3795, 0.8318, 0.5028, 0.7095, 0.4289, 0.3046, 0.1897, 0.1934, 0.6822, 0.3028, 0.5417, 0.1509, 0.6979, 0.3784, 0.8600, 0.8537, 0.5936, 0.4966, 0.8998, 0.8216, 0.6449, 0.8180, 0.6602, 0.3420, 0.2897, 0.3412, 0.5341, 0.7271, 0.3093, 0.8385, 0.5681, 0.3704, 0.7027, 0.5466, 0.4449, 0.6946, 0.6213, 0.7948, 0.9568, 0.5226, 0.8801, 0.1730, 0.9797, 0.2714, 0.2523, 0.8757, 0.7373, 0.1365, 0.0118, 0.8939, 0.1991, 0.2987, 0.6614, 0.2844, 0.4692, 0.0648, 0.9883

**Hint:** Include some extra math functions by:

```
#include <math.h>
```

3) Write code for this function:

```
void blink_freq(int led_number, int freq)
```

where `led_number` is:

0	all leds off
1	led 1 on
2	led 2 on
3	led 1+2 on

and `freq` is the frequency in Hz, i.e. the number of blinks per second.