

# SIT315- Seminar 2- Real-time Systems - part 2

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## Overview

Welcome to the second seminar of SIT315. Form a group of 5-6 students and work on the following activities.

## Submission Details

Each student should submit the answers in the onTrack individually. Please write the names of all of your group members in the first page of your submission.

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## Activity 1- Process Memory Segments

In the week one lecture, you learned how a process is stored in memory.

Process in memory
Stack (tmp vars)
Heap (dynamically allocated data)
Data (global vars)
Text (program code)

Considering the c++ program below, and [4, 5, 8, 3] as user inputs, answer the following questions:

1. Identify what is stored in the text segment when the process is admitted by the OS and is in the ready state.
2. Identify what variables will be stored in the data segment.
3. Identify what is stored in heap and stack segments when line 12 is being executed for the third time.
4. Identify what is stored in heap and stack segments when line 33 is being executed.

Bounce Activity: Build and run the provided c++ code using the SIT315-Head virtual machine, which is located at C:\Virtual Machines\SIT315\SIT315-Head in remote Lab Machines ([www.ada.deakin.edu.au](http://www.ada.deakin.edu.au)).

Refer to this link to learn how you can build and run c++ code using VSCode (<https://code.visualstudio.com/docs/languages/cpp>)

```
1 #include <iostream>
2 using namespace std;
3
4 int size = 4;
5
6 int sum(int n)
7 {
8     static int result = 0;
9
10    result += n;
11
12    return result;
13 }
14
15 int main()
16 {
17     int *p;
18     int i = 0;
19
20     p = new int[size];
21
22     int total = 0;
23
24     for (i = 0; i < size; i++)
25     {
26         cout << "enter number " << i + 1 << ": ";
27         cin >> p[i];
28         total = sum(p[i]);
29     }
30
31     delete p;
32
33     cout<<"the final result is "<<total;
34
35     return 0;
36 }
```

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## Activity 2 - Interrupts

Based on the Tinkercad circuit accessible from the link below, complete the following activities:

<https://www.tinkercad.com/things/3XukUuR7UtR>

1. Based on the design and the code, explain what the primary function of this board is. Complete the code by adding appropriate comments in the designated lines.
2. Identify what the main problem in the code is and how it can affect the end-users.
3. Change the code to resolve the problem you identified in 2.

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## Activity 3- Process Scheduling

In the week one lecture, we have briefly discussed three scheduling algorithms, namely FCFS, Round-Robin, and Preemptive Priority-based scheduling

Based on the table below, answer the following questions:

process	arrival time	burst time	priority
A	0	12	2
B	1	5	4
C	3	2	1
D	4	3	3

**The quantum time is 2, which means each process is only executing for 2 units of time at a time.**

1. Draw three Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, Round-Robin, and Preemptive Priority-based scheduling.
2. For each of the scheduling algorithms, compute the waiting times of each process.
3. Compute the average waiting time of each scheduling algorithm.
4. Research and find another scheduling algorithm that has a lower waiting time than these three algorithms.

After finishing these activities, use the remaining time of the seminar to work on TaskM1.T2P individually. You can find the task description from OnTrack.