

CSI 465 Compiler Design
LAB 3: Memory Allocation and Arrays

Objectives:

- a) Understand memory allocation and register use in variable declarations.
- b) Critically think about memory usage.

1) **Background:** In this lab you will investigate how memory is allocated to arrays and variables. Also, you will consider the local and global environments.

2) **Exercises:**

- a) Type the following code in the Frances code window.

```
int main(){
    int x = 1;
    int A[3] = { 2, 4, 6};
}
```

- i) What memory addresses are assigned to x and each of the array elements?
- ii) Now change the order of the declaration lines. What changes in the addresses assigned to each variable?
- iii) Why do you think the variables are allocated this way?

- b) Next enter the following code?

```
int main(){
    int A[3] = { 2, 4, 6};
    int x = 1;
    return x;
}
```

- i) What changes in the assembly code?

- c) Next change the code to the following.

```
int x = 1;
int main(){
    int A[3] = { 2, 4, 6};
    x = 3;
}
```

- i) What is the difference in the in the memory allocation?