# INTRODUCTION TO ARTIFICIAL INTELLIGENCE
## Lab 6 Matrix multiplication

1)      **Vector multiplication**

$y_1(x_1, x_2, x_3) = 2x_1 + 4x_2 + 3x_3$
$y_1(1, 2, 1\frac{1}{2}) = 2*1 + 4*2 + 3*1.5 = 14.5$

|  | $x_1$ | $x_2$ | $x_3$ | | | $x_1$ | 1 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $y_1$ | 2 | 4 | 3 | * | $x_2$ | 2 | = | $y_1$ | 14.5 |
|  |  |  |  |  | $x_3$ | $1\frac{1}{2}$ | | | |

2)      **Matrix multiplication**

|  | $x_1$ | $x_2$ | $x_3$ | |  | | |  | |
|---|---|---|---|---|---|---|---|---|---|
| $y_1$ | 2 | 4 | 3 |   | $x_1$ | 1 |   | $y_1$ | 14.5 |
| $y_2$ | 0 | 1 | 0 | * | $x_2$ | 2 | = | $y_2$ | 2 |
| $y_3$ | 2 | 0 | 1 |   | $x_3$ | $1\frac{1}{2}$ |   | $y_3$ | 3.5 |

|  | $x_1$ | $x_2$ | $x_3$ | |  | | | | |  | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $y_1$ | 2 | 4 | 3 |   | $x_1$ | 1 | 3 | -2 |   | $y_1$ | 14.5 | 2 | 0 |
| $y_2$ | 0 | 1 | 0 | * | $x_2$ | 2 | -1 | 1 | = | $y_2$ | 2 | -1 | 1 |
| $y_3$ | 2 | 0 | 1 |   | $x_3$ | $1\frac{1}{2}$ | 0 | 0 |   | $y_3$ | 3.5 | 6 | -4 |

|  | $x_1$ | $x_2$ | $x_3$ | |  | | | | | |  | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $y_1$ | 2 | 4 | 3 |   | $x_1$ | 1 | 3 | -2 |   | $y_1$ | 14.5 | 2 | 0 |
| $y_2$ | 0 | 1 | 0 | * | $x_2$ | 2 | -1 | 1 | = | $y_2$ | 2 | -1 | 1 |
| $y_3$ | 2 | 0 | 1 |   | $x_3$ | $1\frac{1}{2}$ | 0 | 0 |   | $y_3$ | 3.5 | 6 | -4 |