

**Computer Science & Engineering Department**  
**I. I. T. Kharagpur**

**Principles of Programming Languages: CS40032**  
*Elective*

**Assignment – 5: Type Systems**

*Marks: 25*

Assign Date: 11<sup>th</sup> March, 2021

Submit Date: 23:55, 18<sup>th</sup> March, 2021

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**Instructions:** Please solve the questions using pen and paper and scan the images. Every image should contain your roll number and name.

1. What is Type? What is Type System? What are the advantages of Type System? [5]  
**Answer:** refer to slide popl 06 Type Systems , page 4, page 5 , page 6.
2. What is *Type Inference*? Give an example of *Type Inference* by Hand-weaving. Write a Type Inference Algorithm for Polymorphic function:  $\text{apply}(f, x) = f\ x$ . [5]  
**Answer:** refer to page 14 , refer to page 18 , soln page 27.
3. Describe *Type Inference Algorithm* in detail. Frame and solve a *Type Constraints* using a Matrix. [5]  
**Answer:** soln page 40 , soln page 42.
4. Give an example of *Overload Resolution* with one parameter. [5]  
**Answer:** soln page 71.
5. Explain in brief *Parametric Polymorphism*. What is *rvalue* reference? Explain with example. [5]  
**Answer:** soln page 73 , soln page 88